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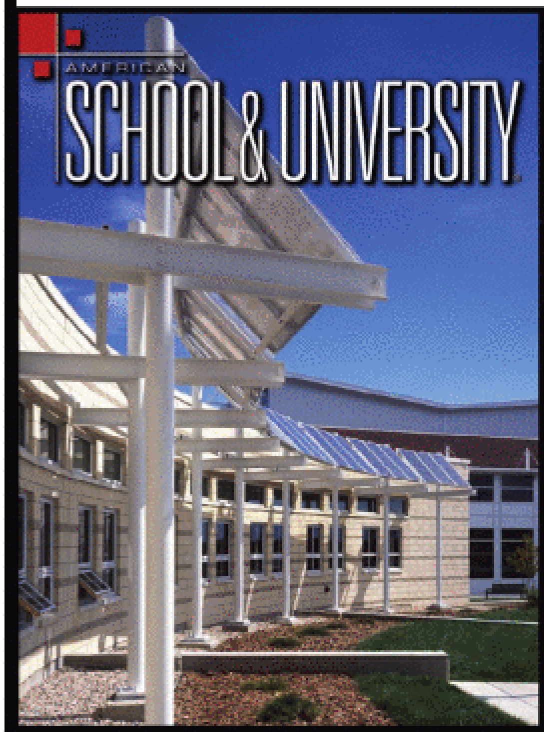

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Photographer: David Patterson

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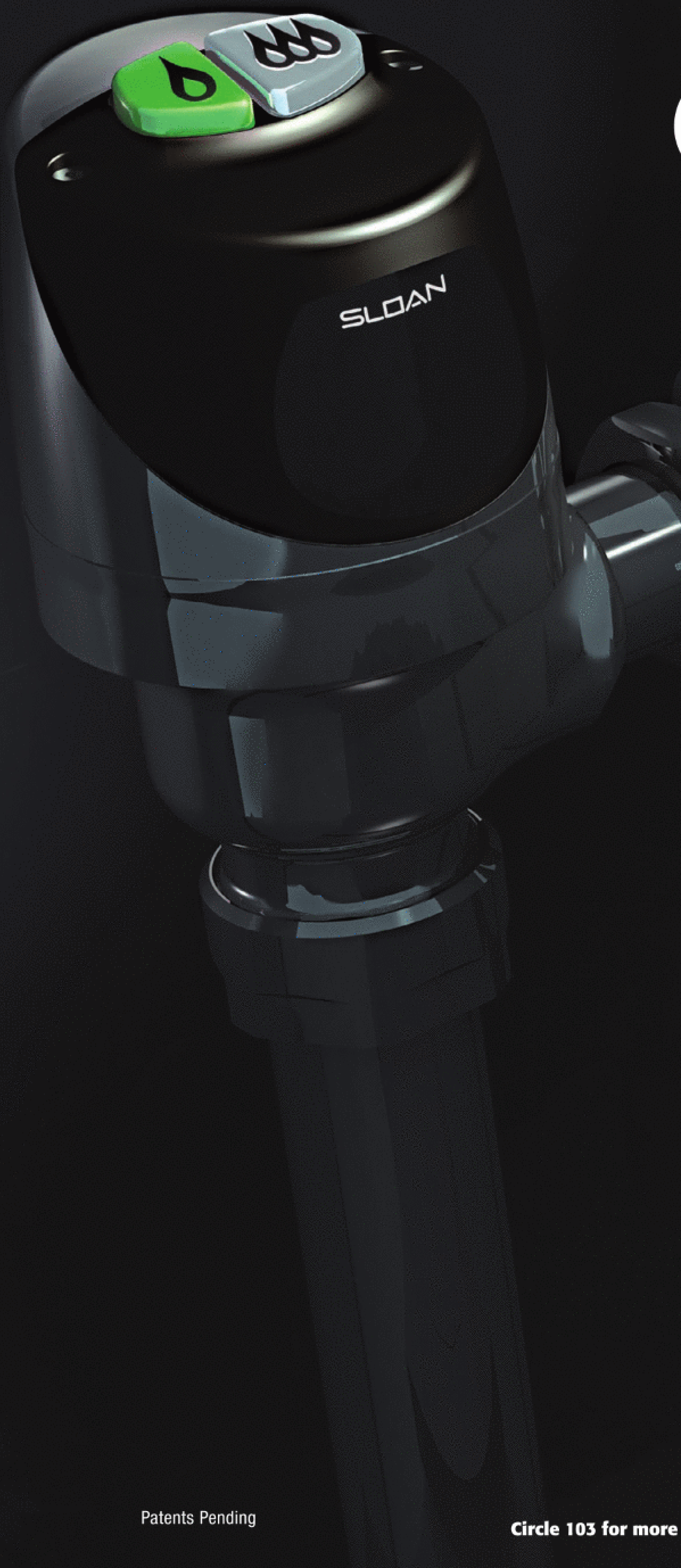

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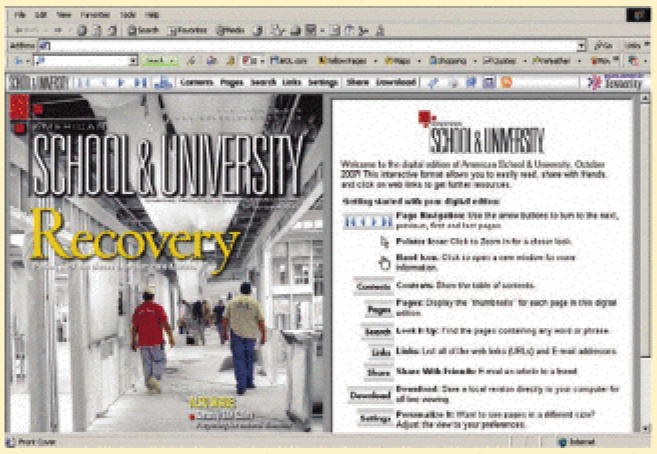

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INSIDE: TRANSPORTATION

MORE STRINGENT REGULATIONS SOUGHT

U.S. Transportation Secretary Mary E. Peters is calling for more stringent safety regulations on school buses.

Peters is proposing that all school buses must have higher seat backs and that small school buses be required to have three-point safety belts. Mandating 24-inch seat backs, 4 inches higher than the current regulation, will better protect children, Peters says.

The proposal also seeks to require that all new small buses be equipped with three-point belts, replacing the current lap-belts-only requirement. Peters says the added protection is needed because smaller buses are more prone to rollover than full-size buses.

"Our proposed rule would make children safer, put parents at ease and give communities a clearer picture of how to protect students," says Peters.

The seat back requirement would go into effect one year after new regulations are adopted. The three-point belt requirement on small buses would go into effect three years after the regulations are adopted.

TRAIN IS BOUND FOR CONTROVERSY

University of Maryland officials say they want a light-rail or rapid-bus system on their College Park campus, but not if it's built on one of the campus' main streets.

State officials planning the so-called "Purple Line" say that running the line along Campus Drive would enable it to serve the most riders. However, university officials say their master plan calls for Campus Drive to be closed to traffic and serve as a major pedestrian mall.

"Turning Campus Drive into a dedicated transit way is inconsistent with this vision of free pedestrian transit," University President Dan Mote wrote last fall in the school newspaper. "A Campus Drive alignment would irreversibly damage the beauty of the campus entrance …. This iconic place will not remain as special as it is today with such an alignment."

In its entirety, the Purple Line would run 16 miles—from Bethesda, Md., to New Carrollton, Md.

In January, Maryland Gov. Martin O'Malley announced that his proposed budget includes $100 million to move the project forward from the planning phase to the engineering phase. ■

TEXAS SEAT BELTS

Texas has enacted a law that eventually will require school buses in the state to have lap-shoulder safety belts in every seat.

The bill signed by Gov. Rick Perry calls for all school buses bought by a school district after Sept. 1, 2010, to have the so-called three-point belts. Charter buses used by school districts to transport students must have seat belts by Sept. 1, 2011.

For buses that already have seat belts, students and drivers are required to wear them now.

"Putting seat belts on school buses will give parents greater assurance that their precious children will be safer when they are out of their sight and not under their control," says Perry.

The law calls on the state board of education to create a training program to teach proper use of the safety belts.

A 2006 bus crash that killed two students from a Beaumont, Texas, high school was the impetus for the law.

STOP FOR BUSES

In an effort to call attention to the problem of vehicles not stopping for school buses, the State of North Carolina takes a day each year to survey bus drivers on whether motorists are violating the law. The results:

Year	Number of participating buses	Number of violations reported	Percentage of buses that reported a violation
2004	13,416	2,188	16.31%
2005	13,518	1,957	14.48%
2006	13,513	2,438	18.04%
2007	13,900	2,310	16.62%

Source: North Carolina Department of Public Instruction Transportation Services

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CONSTRUCTION ZONE

WORKS IN PROGRESS

Magnet school

A middle college magnet school, Great Path Academy, is emerging on the campus of Manchester Community College, Manchester, Conn. Construction on the 75,000-square-foot, $21 million building will be completed in 2009, expanding its facilities to accommodate more than 300 students in grades 10 to 12, for enrollment in unique programs that provide opportunities to earn college credits tuition-free.

The academy will be the first public high school constructed on a college campus in Connecticut. The two-story facility is designed to give students easy access to the college, and to allow the college and magnet school to share facilities. Its unique curriculum and site fully integrate students into the college community.

The exterior design harmonizes with other buildings on campus. The building features specialized learning spaces in addition to classrooms, laboratories, administrative and support areas, a gymnasium, Internet cafe and community room.

The school is being constructed adjacent to one of the campus buildings, and a central heating and cooling plant has been designed and built to effectively meet the requirements of both buildings.

The architect is Tai Soo Kim Partners, Architects (Hartford, Conn.). BVH Integrated Services, Inc. (Bloomfield, Conn.) is the project engineer.

Manchester Community College, Great Path Academy image, Manchester, Conn.

University of Notre Dame, Stinson Remick Hall, Notre Dame, Ind.
Rendering courtesy of BSA LifeStructures/© Anderson Illustration Associates, Inc.

Fostering discovery

Collaborative learning environments will be a hallmark of Stinson Remick Hall, the new engineering and nanotechnology facility for the University of Notre Dame's College of Engineering, Notre Dame, Ind. The facility will include an interdisciplinary learning center, the Notre Dame Energy Center and a nanotechnology center, and will house both undergraduate programs and various research activities for the College of Engineering. The university broke ground for the new facility in November 2007.

The building is designed to fit architecturally within the university's Gothic style, character and campus culture. Its design will create spaces that foster collaboration, experiential learning and discovery where, in addition to classrooms, students and teachers are likely to find enclaves with comfortable chairs and wireless Internet access. The architect is studying the flow and movement of people inside and outside the building, and creating spaces accordingly.

Rather than hiding and separating activities behind opaque walls as in traditional facilities, parts of the new building will be wrapped in glass envelopes, allowing people to see what is going on through double-glass walls, including many of the building's technical functions that normally might be hidden.

The architect is BSA LifeStructures (Indianapolis).

Start: November 2007
Est. completion: Late 2009
Project area: 161,000 sq. ft.
Est. cost: $69.4 million

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Public safety training

Indian River Community College, Treasure Coast Public Safety Complex rendering, Fort Pierce, Fla.

The Treasure Coast Public Safety Complex is a seven-building, 50-acre training complex on the main campus of Indian River Community College (IRCC), Fort Pierce, Fla. The first building in the complex, Vernon Smith Public Safety Education Building, is under construction and scheduled for completion this fall.

"IRCC is planning a unique educational complex combining law enforcement, fire science, emergency management and forensics in one place for training in coordinated response to all types of emergencies," says Edwin R. Massey, the college's president.

Project highlights include new quarters for the 19th Judicial Crime Lab, featuring a simulated booking center with jail holding cells; headquarters for IRCC's Disaster Relief and Humanitarian Assistance Program; a simulated environment for re-enactments of robberies, assaults and other crimes within a "tactical village," complete with facades of retail shops, residential features and a 360-degree digital "shoot-no-shoot" firearms training room; outdoor training fields for search-and-rescue tactical simulations, including a crashed airliner fuselage partly submerged in a 30-foot-deep lake; and an indoor tactical training facility with movable partitions that allow the facility to be configured into an office, school, retail store or apartment for tactical training exercises.

The architect is FLA/Florida Architects, Inc. (Orlando).

Del Sur Elementary School image, San Diego.

Energy saver

Del Sur Elementary School, San Diego, has been designed as a single-building campus and will provide almost one-fifth of its energy through a renewable energy source.

By housing all school functions under one roof, the school's energy efficiency will be 42 percent below California Title 24 requirements. Reduced exterior wall and roof areas decrease the amount of heating and cooling needed, lowering costs and improving the physical environment.

An estimated 19 percent of the school's energy will come from photovoltaic roof panels. An energy-management system will monitor the use of lighting, equipment and HVAC systems. Stormwater runoff will be minimized, and a high-efficiency irrigation system with a satellite controller will ensure that water is used only as needed. The project is expected to be completed by July.

The architect is NTD Architecture (San Diego).

Studio classrooms

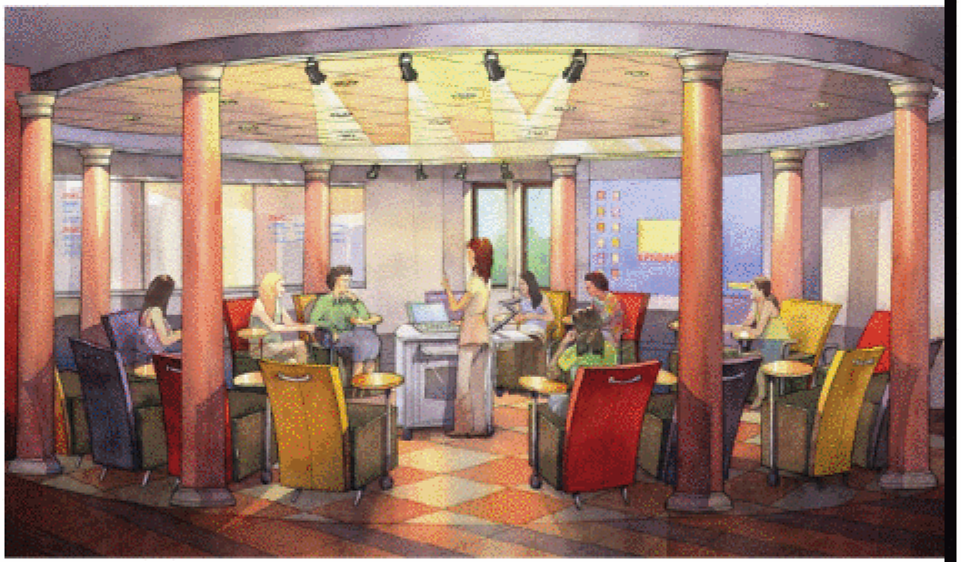
The Learning Studios for Eastfield College, Mesquite, Texas, take a progressive approach to learning through open spaces and unique classroom configurations.

The 55,000-square-foot classroom and administrative office facility features interactive learning environments and studio-like classrooms. A variety of comfortable social spaces outside the rooms will allow for interaction among students and teachers.

The building also will create a new gateway into the campus, which will include an Internet cafe and conferencing facilities.

The project, estimated to cost $11 million, is scheduled for completion this fall.

The architect is HKS, Inc. (Dallas). ■


Eastfield College, Learning Studios rendering, Mesquite, Texas.

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Maintenance

A thorough plan enables schools and universities to maintain facilities and equipment effectively.

In the annual budget scrum that takes place at schools and universities, maintenance staffs regularly find themselves on the losing end. So to maximize the effectiveness of their limited maintenance budgets and make sure facilities are clean, healthful and safe, education institutions must plan wisely.

"No building can perform optimally without adequate maintenance," says the Northeast Collaborative for High Performance Schools Protocol, a guide to energy-efficient, environmentally friendly facilities.

"Training is critically important for maintenance staff to thoroughly understand how to maintain and operate the building systems. When staff turnover occurs, appropriate documentation must be on hand in order to train new team members."

Having a maintenance plan is considered one of the prerequisites for a high-performance school, according to the protocol, which is based on the criteria of the Collaborative for High Performance Schools and adapted to fit the conditions in the Northeast region of the United States. It says a maintenance plan should include an inventory of all equipment in a school, including HVAC, plumbing, non-HVAC mechanical systems, lighting, building control systems, life and safety systems, interior finishes, roof systems and switchgear.

"Qualifying maintenance plans will include all regularly scheduled preventative maintenance tasks over the lifetime of the building system or equipment," the protocol states. "These tasks include cleanings, calibrations, component replacements and general inspections."

The protocol awards additional credit to schools that use a computerized maintenance management system (CMMS). CMMS enables schools to keep track of maintenance needs, schedule required work, and follow the status of a work order. The systems also enable schools to create a history of completed projects.

Another prerequisite in the high-performance protocol calls for schools to adopt the U.S. Environmental Protection Agency's "Tools for Schools" program or an equivalent program to ensure indoor health and safety. The "Tools for Schools" program "establishes responsibilities and clear communication channels so that indoor air problems can be prevented and problems can be quickly identified and solved."

Building commissioning is another key element in maintenance management, according to the protocol. Commissioning, it says, should include documenting the design intent and operation protocols for all building systems; verifying system performance through well-documented testing and measurement; preparing comprehensive operation and maintenance manuals; providing appropriate training of building operations staff; and monitoring system performance on an ongoing basis. ■ –*Mike Kennedy*

NOTABLE

5 to 20 Percentage in savings schools can achieve by effectively managing, maintaining and operating school physical plants.

$8 billion Amount U.S. schools spend each year on energy.

Source: School Operations and Maintenance: Best Practices For Controlling Energy Costs, U.S. Department of Energy

9.19 Percentage of expenditures allocated to maintenance and operations in the median U.S. school district, 2006-07.

Source: "36th Annual Maintenance & Operations Cost Study," American School & University

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Green

The seeds they planted years ago in support of environmentally friendly education facilities are beginning to blossom.

BY MIKE KENNEDY

Not so long ago, some derisively called them treehuggers. Education administrators and designers who raised environmental issues would urge schools and universities to adopt more efficient energy use, pursue recycling and conserve water—that all made sense, but where would they stop? With solar panels? Wind turbines? Roofs with plants growing out of them? Urinals that don't use water? Heating and cooling systems that pull energy out of the ground? People with a business to run couldn't waste precious time obsessing on such touchy-feely matters.

Now, fuel prices are settling in at historically high levels; warnings about the melting polar ice cap no longer are dismissed as irrelevant; entire TV channels are dedicated to the environmental movement; and the politician once mocked as "Ozone Man" for his relentless focus on ecology has won a Nobel Peace Prize and an Academy Award for his insistent warnings about the consequences of global warming.

More and more people are viewing the world through green-tinted glasses, and those crazy ideas about making school and university facilities more environmentally friendly suddenly are appearing to be prudent and responsible.

"This past year is when things finally took off," says Anja Caldwell, green building manager for Montgomery County, Md., schools.

High-performance leadership

Among the groups that have been advocating for environmentally friendly school design for years are the Collaborative for High Performance Schools, whose *Best Practices Manual* for high-performance school construction has been adopted by the U.S. Department of Energy; and the U.S. Green Building Council (USGBC), whose Leadership in Energy and Environmental Design (LEED) certification has provided incentives for numerous education institutions to embrace green design strategies.

The LEED rating system picked up additional momentum in 2007 when the USGBC established a rating system specifically for K-12 schools.

"We now are registering an average of one school project a day," says Rachel Gutter, school sector manager with the USGBC. "It's a pretty tremendous response. The market is ready for it."

As its name implies, LEED for Schools accounts for issues and conditions that are more critical in a K-12 setting, such as acoustics, mold prevention and

Leaders

Fossil Ridge High School
Fort Collins, Colo.

Architect: RB+B Architects, Inc.
Photographer: David Patterson

using the facility itself to teach.

"K-12 is one of the greatest areas of uptake in green construction," says Gutter. "Green schools really resonate with most people. It's about children—healthy kids and a high-performance environment."

LEED for Schools addresses some of the omissions that had convinced some administrators that the system was not a good match for their schools.

"It's easier for schools to adapt to LEED for Schools," says Montgomery County's Caldwell. "Before it was a mitten. Now it's a glove."

> "It's easier for schools to adapt to LEED for Schools," says Caldwell. "Before it was a mitten. Now it's a glove."

Colleges and universities can seek LEED certification using either the New Construction or Schools rating system, but K-12 schools need to use the new LEED for Schools system, Gutter says.

Caldwell says that in Montgomery County, her green efforts occurred under the radar and mostly were focused on energy conservation.

"The feeling was, 'If it doesn't produce kilowatt-hour savings, we're not interested,'" she says.

Gradually, the school district embraced a broader perspective about green schools, and Great Seneca Creek Elementary School, which opened in Germantown, Md., in 2006, became the first school in the state to receive a gold LEED rating.

The school is expected to conserve 370,000 gallons of water a year because of low-flow fixtures, waterless urinals and dual-flush toilets. The school has a reflective roof to reduce the heat-island effect, a geothermal heating system to reduce energy costs by 30 percent, and includes bike storage and showers to encourage bicycling. The project recycled about 90 percent of its construction waste.

When the Montgomery County government mandated silver LEED standards for the county's public facilities in 2006, officials came to Caldwell with concerns.

"They said, 'Can we do this?'" Caldwell recalls. "And we could tell them, 'We already did.'"

Another catalyst spurring the green movement forward is the Ohio School Facilities Commission's decision to incorporate LEED standards into the state's school construction

LEED and CHPS

So you want to build a green school, but you don't know which recipe to follow. You could LEED the way to a green facility through the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification system, or you could place all your chips on the CHPS criteria put together by the Collaborative for High Performance Schools.

CHPS criteria were developed specifically for school projects and initially focused on California schools. The USGBC's LEED system had a national scope, but at first chose not to develop a specific school category. But now that CHPS has expanded its presence to become more of a national program, and the USGBC has created a specific LEED for Schools system, the differences may be more difficult to discern.

"Although both rating systems have similar intents, the CHPS criteria and LEED are structurally, philosophically and programmatically different," CHPS says in a paper that discusses green building options for schools.

For instance, LEED for Schools awards a possible 79 points and has four levels of certification—certified (29-36 points), silver (37-43), gold (44-57) and platinum (58-79). CHPS awards a possible 85 points. It takes 32 points for a new school to meet CHPS criteria, and the rating system does not have more specific levels of achievement.

The CHPS paper states that it was developed "with the knowledge and support of the USGBC." At the time, the USGBC had no plans to create a rating system specifically for schools. CHPS did not want to use the LEED for New Construction system because it "did not address many issues critical to high-performance schools, such as acoustics, daylighting, electric lighting, low-emitting materials, joint use of facilities, etc."

The LEED for Schools rating system, which the USGBC began using in 2007, now covers most of those issues.

Rachel Gutter, school sector manager for the U.S. Green Building Council, says LEED's platinum, gold and silver rankings appeal to educators and administrators who are comfortable with taking tests and receiving grades for their efforts.

LEED certification "is a badge of honor for them," says Gutter. "It is a verification. Schools need to prove they've done these things. It shows teachers and parents exactly what they're getting."

Several states have used CHPS guidelines to develop design and construction standards for schools.

In Washington state, the Sustainable Schools Protocol is a certification system similar to LEED, but it is based on CHPS criteria. Patricia Jatsczak, high-performance building program manager for the Washington state Office of Public Superintendent of Instruction, says that although her state relied more on CHPS because it is more easily adapted to account for regional differences, both systems are valuable.

"It's the same goal—building greener schools," she says.

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guidelines. All new construction or major renovation projects in Ohio's public schools must seek at least a silver LEED rating.

"That's a minimum of 250 schools in the next few years," Gutter says.

At the higher-education level, the growing commitment to green in 2007 was exemplified by the American College and University Presidents Climate Commitment.

As of January, the leaders of more than 470 schools had signed the commitment, which calls for each institution to develop a plan for becoming climate-neutral within two years. Among the steps the commitment encourages are constructing new campus facilities to achieve at least a silver LEED rating and adopting a policy to purchase Energy Star-certified products when possible.

"While we understand that there might be short-term challenges associated with this effort," the commitment states, "we believe that there will be great short-, medium-, and long-term economic, health, social and environmental benefits, including achieving energy independence for the U.S. as quickly as possible."

Hippie dream

The genesis for the Poudre (Colo.) District's embrace of sustainable design, jokes Bill Franzen, the district's executive director of operation services, was "a bunch of old hippies in a position of authority."

As these school officials began talking in 1999 about the next generation of Poudre schools, their ideas about environmentalism, enhanced by the college-town atmosphere of Fort Collins, the home of Colorado State University, and inspired by the beauty of the nearby Rocky Mountains, resulted in a guide for sustainable design.

The guidelines listed 11 features that should be present in a sustainably designed school: sustainable site planning and landscape design; use of renewable energy sources; high-quality and energy-efficient lighting; an energy-efficient building shell; energy-efficient HVAC systems; environmentally preferable building materials; water conservation;

Greening L.A. campuses

If you're wondering about the Los Angeles Community College District's (LACCD) commitment to green construction, the answer is evident in the name of the website for its construction program: laccdbuildsgreen.org.

When the district completes the projects included in its $2.2 billion bond program, more than 40 new buildings on its nine campuses will have achieved LEED certification.

Several projects began construction in 2007, including the $46 million Center for the Sciences—a two-story, 100,000-square-foot building at Pierce College in Woodland Hills; and a $38 million, 85,000-square-foot Science and Technology Center at Los Angeles City College.

Another element of the system's green building effort is an ambitious plan to install photovoltaic panels at each of its nine campuses. The goal of the "9 Megawatt Solar Energy Plan" is for each campus to produce at least 1 megawatt of electricity through solar power, which would be enough to meet all daytime electricity needs.

The LACCD is one of 11 partners chosen by the Clinton Climate Initiative to launch a pilot program aimed at significantly reducing greenhouse gas emissions. In November 2007, California Gov. Arnold Schwarzenegger awarded the community college district the Governor's Environmental and Economic Leadership Award. It recognizes organizations that have demonstrated leadership in conserving resources, protecting and enhancing the environment, and building public-private partnerships.

The Los Angeles Southwest College Child Development Center is the second LEED-certified facility to open in the Los Angeles Community College District. Photo courtesy of Glen Marzano

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Kinard Junior High School, Fort Collins, Colo., is an example of Poudre School District's commitment to sustainability. (Architect: RB+B Architects, Inc.) Photo courtesy of Fred Fuhrmeister

As designed, the Allied Health & Sciences Center at Los Angeles Valley College should qualify for a LEED silver rating. The 98,000-square-foot building is scheduled for completion this spring. (Architect: CO Architects) Photo courtesy of Glenda Vaquerano-Briones

recycling and waste management; construction-waste reduction and recycling; commissioning; and eco-education.

Poudre officials felt confident that the process they established was resulting in green school facilities. They decided to seek validation of their efforts by submitting Fossil Ridge High School, which was completed in 2004, for LEED certification.

"We had an intuitive sense that it was environmentally responsible and energy-efficient," says Franzen. "LEED certification reinforced our belief that we were on the right track."

The facility received a silver rating under LEED for New Construction. The school uses 60 percent less energy than a comparable high school in the district—saving $104,000 a year. Low-flow faucets and toilets, a water pond for irrigation, and an artificial surface on the athletic field help the school save $11,500 a year on its water bill. Franzen says that Fossil Ridge probably would have received a gold rating had the new LEED for Schools ratings been used.

Poudre also has built four elementary schools using a prototype design based on the district's sustainable guidelines. The last of those, Bethke Elementary, is scheduled to open later this year, and Poudre is seeking LEED certification for the project. Franzen says the LEED certification (he expects Bethke to earn a gold rating) will serve as evidence that "we have been doing the right thing."

Caldwell, a native of Germany, envisions a time when green features now routinely used in European facilities—wind turbines, photovoltaic panels, waterless urinals, dual-flush toilets—become an expected and accepted part of U.S. school buildings.

"In 10 years, people will be amazed that we ever flushed our toilets with fresh water," says Caldwell. "Green roofs will be commonplace. There will be no incandescent light bulbs. They'll be obsolete, like an old vinyl record."

As sustainable design becomes common, the USGBC plans to push for even greater inclusion of green strategies in schools and other facilities.

"We're headed in a direction where what we call green now will be called standard," says USGBC's Gutter. "The momentum is there. We have to continue to raise the bar."

Sustaining the sustainability

In the Poudre district, they are not only trying to raise the bar, but also trying to make sure future district leaders keep raising it higher.

Poudre leaders have put together a Sustainability Management System (SMS) that will enable the school system to incorporate sustainable design and operations into the policy and practices of the district.

Franzen says part of the impetus for creating the sustainability management system was that many of those involved as the green school movement began were approaching retirement age. Poudre district leaders want to make sure their ideas and philosophies outlast their tenure in the district.

"We wanted a system in place so that we could sustain the sustainability," says Franzen. "We didn't want the district to backslide."

According to the 59-page document describing the SMS, one of its goals is to help the Poudre district "extend its demonstrated leadership in the green building and energy conservation arenas to leadership in the operational sustainability arena."

The SMS spells out the district's long-term goals in resource conservation, greenhouse gas emissions, sustainable education and transportation. In addition, it lists numerous short-term goals in almost every area of district operations—maintenance, business and finance, communications, curriculum, food services, information technology, security and staff development.

Beyond the bottom line

For school administrators responsible for educating students with often-scarce budget resources, cost savings and gains in student performance usually are the most compelling arguments. Montgomery County's Caldwell says that when she makes presentations about green schools to other administrators, "some are only interested in the numbers. I've gotten pretty good about showing the numbers."

But at some point, Caldwell believes, the education community should be ready to adopt green principles even if the efforts don't benefit the bottom line.

"I think we need to move away from thinking these things will pay for themselves," says Caldwell. "Some never will. You can't translate environmental damage into numbers. You're not seeing the real price. We should be doing it because it's the right thing to do." ■

Kennedy, staff writer, can be reached at mkennedy@asumag.com.

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Classrooms at Harding Elementary School, Hammond, Ind., have ergonomic seating that can tilt from front to back, side to side, and turn and roll. (Architect/Engineer: Fanning Howey) Photo courtesy of VS America, Inc.

The Right Fit

When buying furniture, schools and universities should consider ergonomics.

By Tim McGee

Students in primary and secondary school can expect to be at school an average of seven hours a day; students attending college are encouraged to dedicate at least 35 hours a week to studying—in addition to time spent in the classroom. The time and energy devoted to learning doesn't affect just the mind; it also can take a toll on a person's physique. A student's body type can be as unique as his or her study habits.

In consideration of the extended periods of time students and faculty spend in libraries, computer labs, classrooms and study halls, learning facilities need to provide comfortable and functional furnishings that can adjust to individual needs,

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including height, build and working preferences.

Size matters

Creating a comfortable and flexible learning environment can have a significant effect on a student's stamina. Often, students must use the same desk and workstation as the student before them. A desk height that is comfortable for a varsity basketball player most likely will not be comfortable for a cheerleader.

A one-size-fits-all setting is not conducive to learning. In a higher-education facility, three to 25 people a day can be expected to use the same workstation, and the slouching, straining or leaning that some students are forced to do to use a workstation can cause physical discomfort and fatigue. To enhance performance and minimize fatigue and injury, learning establishments should be equipped with ergonomic workspaces that adapt to body size, strength and range of motion.

The advancement of technology has resulted in the presence of computers and related equipment in nearly all educational and office settings. A recent survey of 500 office workers indicated that more than 89 percent reported feeling muscle tension or fatigue at least occasionally at the end of their workdays. With the likelihood that many people will be using workstations from primary school to retirement, schools and universities should be taking steps to get students thinking and living ergonomically before stepping into an office setting.

Healthful contributions

Having the wrong furniture and equipment or using it improperly can result in repetitive stress injuries, which include carpal tunnel syndrome, tendonitis and other conditions indicating damage in muscles, tendons and nerves.

Project areas at Washington Irving Elementary School, Hammond, Ind., have stackable task chairs that have an ergonomic rocking mechanism to improve comfort. (Architect: Fanning Howey) Photo courtesy of Maguire Photographics

To help students and staff learn how to prevent these injuries, schools can use simple awareness techniques, such as placing informational posters and packets in study areas and break rooms. A school could start an ergonomics club to teach injury-prevention strategies such as recognizing fatigue, avoiding at-risk positions for extended periods of time, taking breaks from work, and varying or altering tasks.

The following guidelines also are essential to consider:

•**Eye breaks**. Viewing computer screens strains the eyes. Look away briefly from the screen every 15 minutes. This allows the muscles inside the eye to relax.

•**Micro breaks**. Every 30 to 60 minutes, take breaks, less than two minutes in length, to stand, stretch or move around. This provides an opportunity to rest hands and wrists, and relieves pressure from any strained positions.

•**Stretch breaks**. To help relieve muscle fatigue, perform simple, gentle stretches for a minute or two every one to two hours.

In addition to preventing potential injuries, a school office can incor-

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4 To help prevent eye strain, the number of times per hour (every 15 minutes) that a person should briefly look away from his or her computer.

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Creating a comfortable and flexible learning environment can have a significant effect on a student's stamina.

porate ergonomics to set a positive example for students.

Passing the final test

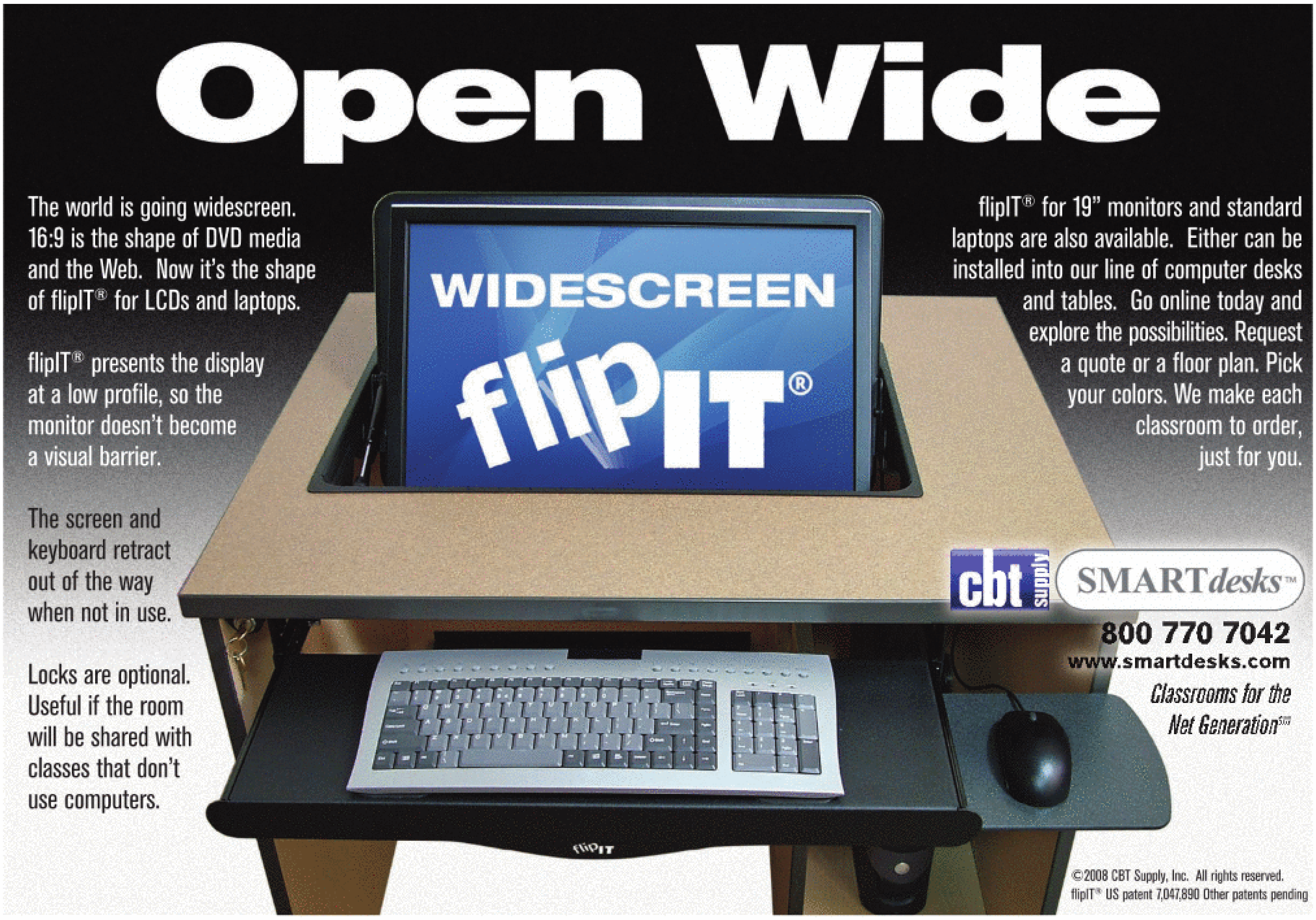
A key to improving ergonomics in classrooms is the adoption of height-adjustable desks and workstations, keyboard trays and articulating monitor mounts. Users can adapt them for their own personal comfort so they can achieve better posture and prevent muscle strain and fatigue.

Essential components of adjustable workstations include the ability to alternate between seated and standing positions. They should be configured to optimize the "primary front reach zone" by placing the frequently used tools (keyboard and mouse) within easy reach. Additionally, computer monitors mounted on articulating arms enable users to position them for optimal comfort.

In higher-education environments, key areas to incorporate ergonomic features are in residence halls, lounges and study areas—places where students typically spend much of their time outside the classroom. Also, as the use of laptop computers rises, docking stations in these areas are of equal importance. Docks enable students to supplement their laptop with a full-size keyboard and external mouse, and help prevent injuries caused from using laptop keyboards and pointers.

Every school will have its own set of needs and ergonomic requirements. As education institutions look to develop new study areas, classrooms, offices and public spaces, countless issues arise, such as the type of materials, durability, colors and style. By focusing on simple, flexible and easy-to-operate furniture and equipment, schools and universities can provide students and staff members with ergonomically correct solutions. ■

McGee is project manager for WorkRite Ergonomics, a provider of ergonomic products based in Petaluma, Calif.



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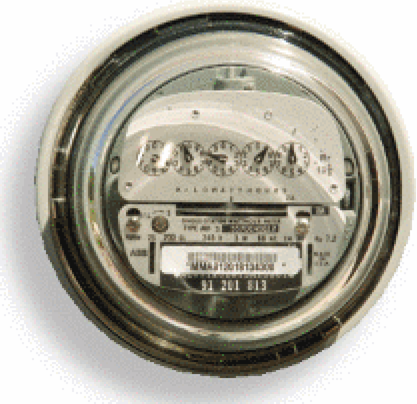

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Designed to the equivalent of LEED gold certification, the new Hamilton Avenue School, Greenwich, Conn., will feature a geothermal system, extensive daylighting and top-lighting of classrooms, and a super-insulated building envelope.

The Shape of Things

A high-performance school relies first on form and materials, and then on systems.

By Joe Aliotta and Gerald Pde

Many people narrowly focus on energy efficiency when defining a "high-performance" school—a school building that is economical with respect to heating, cooling and electric lighting. That is certainly true, but in the broadest terms, a high-performance school is designed to minimize reliance on fossil fuels—and provide a comfortable, healthful, productive and beautiful learning environment—by optimizing the efficiency of the building form and mechanical equipment.

Working together, architects, engineers and environmental designers can achieve this complex goal by integrating effective school planning,

sustainable architecture and sophisticated building performance analyses. In the process, they use energy modeling early in the design process to analyze the building envelope, and mechanical and electrical loads. Daylighting, ventilation and mechanical/electrical strategies are used to develop and refine the design.

Laying the foundation

Design-stage analysis is possible through a range of modeling software, depending on the nature of analysis required. These include a program patented by the U.S. Department of Energy and Lawrence Berkeley Laboratory, as well as proprietary software developed by manufacturers of mechanical systems and independent researchers. Building-performance benchmarks based on a designer's experience with various types of buildings in various locations also serve as useful rule-of-thumb tools for qualitative and quantitative analysis. Ideally, a design team should work together as early as the conceptual design phase to identify the site and climate factors that affect the building envelope.

The thermal performance of a building envelope—roof, wall, window and floor systems—is critical in determining energy consumption for heating and cooling. Likewise, the design of an efficient building envelope lays the foundation for the design of a high-performance school. In an early design-stage building envelope study, a whole-building energy simulation of the school can provide a useful initial assessment of the annual heating and cooling requirements. This study can help determine the energy use that can be attributed to the building envelope. It focuses on massing and the insulating properties of the building envelope.

Building energy simulation typically uses a "base case" for com-

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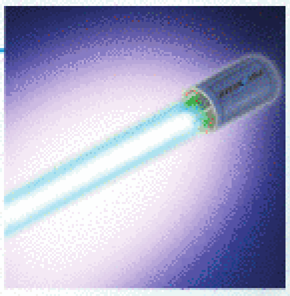

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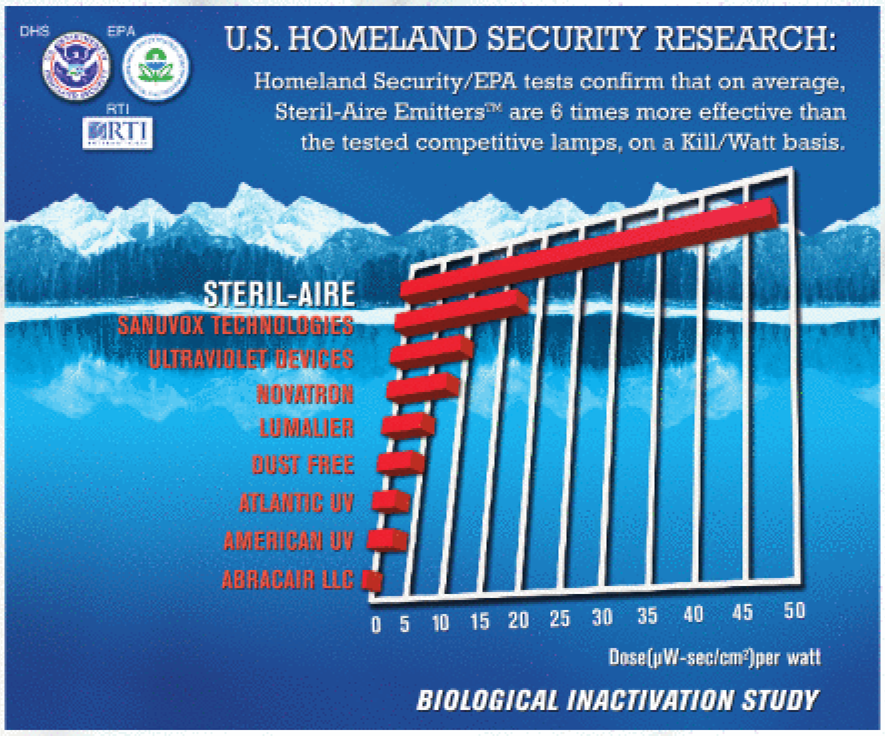

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The new Hamilton Avenue School includes new construction, as well as the partial restoration and reuse of a historic 1938 building.

Effective use of daylight is critical in a high-performance school; lighting loads typically account for 20 to 30 percent of total energy costs.

parison—that is, a building whose roof, wall and underfloor R-values and glazing U-values meet the minimum code requirements set by the ASHRAE 90.1 standard, which is used by the U.S. Green Building Council. The modeling process compares the predicted energy performance of the base case against the design alternatives, whose energy-efficiency measures may have individual or cumulative effects on building performance. Whole-building energy modeling typically focuses more on the sensitivity of the overall envelope than on the localized effects of the envelope on individual spaces.

Optimizing daylight

Effective use of daylight is critical in a high-performance school; lighting loads typically account for 20 to 30 percent of total energy costs. An effective daylighting strategy reduces dependency on artificial lighting and enhances the quality of the indoor environment.

Daylighting studies investigate glazing configurations required to achieve an average target daylight factor of at least 2 percent on the work-plane, which is a minimum recommended target to achieve adequate daylight in a space. Daylight factor measures the percentage of outside light that penetrates into the space under an average overcast sky condition, making it a good indicator of the daylight availability in the space.

But effective daylighting is dependent not only on the quantity, but also the quality of light. If the light level in one part of a space is substantially higher than levels in another part, then the space could appear dark and gloomy, and glare conditions are likely. Relatively uniform light distribution of daylight serves as an indicator of daylight quality.

A daylighting study looks at the effects of various window shading configurations and their effects on daylight in classrooms on all levels of the building. A typical study also considers the reflectance values of ceilings, walls and floors, as well as the light-transmission values of various types of glass. The results of the study typically include a graph mapping the percentage of hours throughout the year when diffused light levels meet or exceed certain target daylight levels, or 3D renderings showing light levels in a space.

The study also may include a human perception rendering representing what one actually would see in the classroom. Human perception images adjust the calculated light levels based on the characteristics of the human eye. The eye only can perceive a limited range of light levels: as the pupil contracts to focus on an area with high light levels, the areas with lower light levels are perceived as darker, and vice versa.

The results are used as the basis to develop design strategies to achieve uniform lighting throughout each space using a combination of daylight, electric light and shading.

Ventilation strategies

An effective ventilation strategy also is critical in a high-performance school because it improves indoor air quality and thermal comfort, and reduces reliance on conventional mechanical systems. Today's displacement ventilation strategies go well beyond the use of conventional mixed ventilation. Ventilation strategies also can be analyzed early in the design process to assess their energy efficiency and life-cycle costs. These

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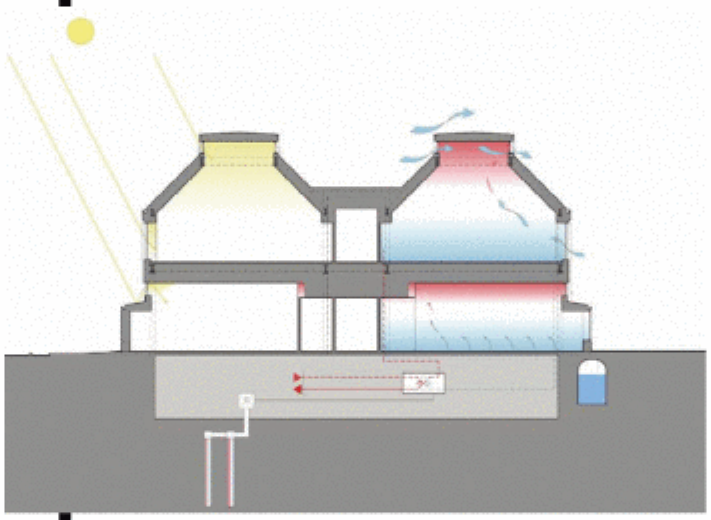


Studies of daylighting and ventilation strategies can help schools and universities become more energy-efficient.

Achieving the gold standard

The new Hamilton Avenue School, a pre-K to 5 facility under construction in Greenwich, Conn., was designed as a high-performance school.

The project includes 60,000 square feet of new construction, along with the partial restoration and reuse of a historic 1938 building, accounting for an additional 16,000 square feet of space. The contemporary design of the new portions of the building complements the historic fabric of Hamilton Avenue in Greenwich through the preservation of the civic front of the existing school, a brick and stone building with a slate roof and signature cupola. Classrooms are organized in clusters by age group. The new gymnasium and cafeteria will be designed to accommodate multiple functions and community use.

Designed to the equivalent of LEED gold certification, the school features a geothermal system, extensive daylighting and top-lighting of the classrooms, displacement ventilation and a super-insulated building envelope. The school chose not to pursue formal LEED certification because it would have incurred additional cost for registration and submittal, and certification is not a Connecticut state mandate.

The design incorporated energy and daylighting analysis; modeling studies and life-cycle cost analyses of certain aspects of the building envelope; natural ventilation strategies; and assessment of the costs and benefits of using a geothermal system over a chiller-boiler system.

For example, factoring in the results of the building envelope, ventilation and daylighting studies, the geothermal energy modeling study compared a ground-source heat-pump system to a four-pipe chiller boiler system. The results found that the geothermal system would achieve a simple payback in just 8.1 years, returning a net-present-value savings of more than a quarter million dollars over 25 years.

Overall, a life-cycle energy cost analysis projected a five- to seven-year payback for the upfront costs of high-performance design strategies compared with a conventionally designed school.

strategies can include simple systems, such as side-wall displacement terminals, and more complex underfloor systems.

In addition to widely available raised-floor systems, non-conventional underfloor air systems can deliver air and improve the thermal comfort in a space. They reduce the need for ductwork and drop ceilings, and provide radiant and forced-air heating through a network of steel forms embedded in the concrete slab. Another alternative distributes ventilation air via a duct integrated with the partition walls between two classrooms. The supply vents can be on the wall or integrated with classroom furniture.

Meeting demands

Displacement ventilation and envelope strategies can reduce cooling and heating loads in the building. Mechanical energy is required to meet the remainder of the building load and provide a comfortable environment. After the building envelope is optimized, the school and design team may choose to evaluate supplementary mechanical systems, such as chiller-boiler mechanical systems or advanced geothermal systems. The team, ideally, also will consider further strategies to optimize the chosen system, including careful selection of variable frequency drives, fan motors, heat-rejection equipment and building automation controls.

A geothermal heating and cooling system can be a good choice for a school that has relatively uniform heating and cooling loads, and that is on a site that offers adequate installation area, such as athletic fields, to serve as a geothermal well. In this system, a geothermal heat pump takes advantage of the relatively stable earth temperature (45°F to 58°F) deep in the ground. Water or another liquid is circulated through pipes buried in a continuous loop in the geothermal well. Depending on the temperature in a building, the water is used to transfer heat into or out of the building.

In addition to these key issues and systems, a high-performance school design also requires analyses of water-management issues—in particular, stormwater management, landscape design and maintenance, and indoor plumbing fixtures. For example, rainwater-harvesting strategies that employ the roof structure may be investigated during the building envelope study. ■

Aliotta is principal of Swanke Hayden Connell Architects, New York City. Pde is an associate, practice leader-building simulation and systems analysis, with Atelier Ten Consulting Environmental Designers, New York City. The firms collaborated on the Hamilton Avenue School (see sidebar above).

Swarthmore College, Swarthmore, Pa., installed a green roof garden atop the Papazian Building expansion. Photo courtesy of Roofscapes, Inc.

Top Job

What's on top of an education facility and the resources devoted to inspection and maintenance will determine whether a roof will last.

By Mike Kennedy

Deferred maintenance has been one of the great failings of many of the nation's education institutions, and roofs—out of sight, out of mind—are one of the easiest elements of maintenance to neglect.

Of course, as many administrators have learned through the years, the cost of putting off routine inspections and preventive maintenance can be leaks, mold growth, serious structural damage to a facility and serious health risks for students and staff. As more schools and universities have begun to embrace green strategies in building and maintain-

ing their facilities, the health and safety of the indoor environment is driving facility managers to be more vigilant about roofing maintenance, and to seek out roofing types that can conserve energy and have less impact on the environment.

Regular checkups

Although many schools and universities don't have enough maintenance staff and resources to inspect all their roofs twice a year, that is what roofing experts recommend.

Inspections in the fall will enable maintenance workers to clear a roof of leaves and other debris before winter weather strikes, and a spring follow-up will reveal whether the roof sustained any significant wear or damage during the winter.

"A proper inspection program is an important aspect of maintenance and can identify problems before they impact energy use and affect occupants' health," says the Collaborative for High Performance Schools (CHPS) *Best Practices Manual*.

The CHPS urges schools to maintain thorough records about each roof—the type of roof, its size, its installation date, the contractor, warranty information, and a history of inspections and repairs.

Inspections should include checks on cap flashings, edge metal, base flashings, penetrations (pipes, drains, exhaust), field of the roof, ballast, and roof adhesives and coatings.

On the roof membrane, inspectors should check for worn spots, blisters, holes or deteriorating sections, the CHPS manual recommends. For flashings, workers should look for any loose or missing fasteners, corrosion, and cracking or aging sealants. If possible, workers also should inspect the interior of the roof to see if moisture has penetrated the building.

School maintenance staff should ensure that any runoff drains properly from a roof, and that roof edges are properly secured. Minimize foot traffic on a roof and provide protective walkways in areas where traffic is expected.

If an education institution decides to replace a roof, it must take special precautions if the existing roofing contains asbestos.

"When asbestos is disturbed by sanding, cutting and other renovation-type activities, asbestos fibers become airborne, creating an added risk of lung cancer and other lung diseases," the CHPS manual warns.

Be cool

About 90 percent of roofs in the United States are dark-colored, according to the U.S. Environmental Protection Agency (EPA). Those roofs typically absorb greater amounts of heat from the sun and force a building's cooling system to work harder to keep the interior comfortable.

The phenomenon is exacerbated in urban and suburban areas that experience the "heat-island effect." The high density of buildings, pavement and vehicles in those areas can result in temperatures 2 to 10 degrees (Fahrenheit) higher than nearby rural areas.

One of the primary strategies for combating the heat-island effect and easing the demand placed on a building's cooling system is installing a cool roof.

Two critical characteristics of cool roofs are high solar reflectance—the percentage of solar energy that is reflected by a surface—and high thermal emissivity—the percentage of energy a material can radiate away after it is absorbed. The less heat a roof absorbs, the less energy that is needed to keep a building cool.

"By limiting the quantity of absorbed solar energy, damage from ultraviolet radiation and daily temperature fluctuations—which cause repeated contraction and expansion—can be reduced," the EPA says.

Green on top

The University of Pennsylvania has installed its first "extensive" green roof on its Philadelphia campus.

The environmentally friendly roof sits atop the English House/Kings Court student residence. The university says the roof has low-maintenance alpine sedums and mosses, which grow slowly but eventually provide a dense cover that does not need watering or maintenance.

Green Roofs for Healthy Cities, an association that works to promote green roofs, cites numerous benefits of green roofs. The layers of a green roof can prolong the life of a roof membrane; provide insulation to reduce energy costs and noise; provide more stormwater retention; and convert carbon dioxide to oxygen. On some green roofs, herbs, flowers and vegetables can be grown and reduce food-service costs.

The university says installing the roof will benefit the campus in several ways:

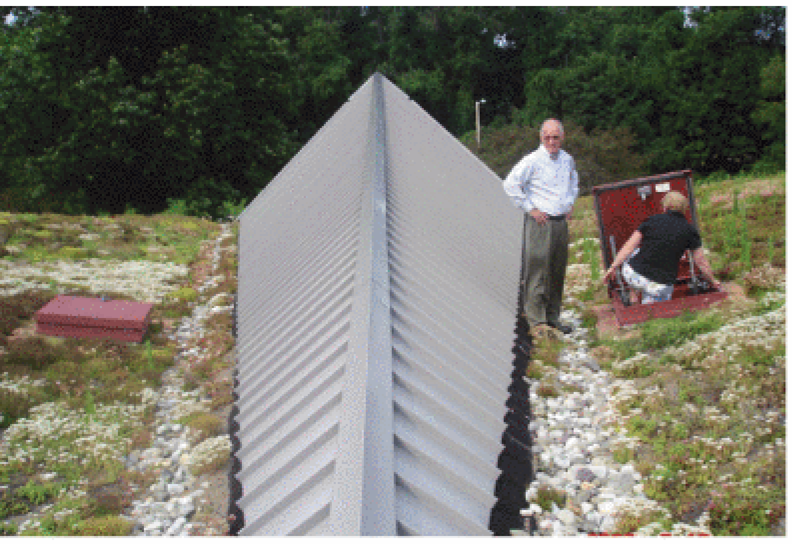
•Evaporative cooling will counteract the heat-island effect and reduce the temperature on the top floor of the building.

•The additional insulation will help moderate winter temperature swings on the top floor.

•By retaining storm water, the roof will help the university manage campus discharge and prevent flooding.

•The vegetation will protect the waterproofing membrane from ultraviolet radiation and from frost. This will reduce leaks and help extend the life of the roof.

•The roof will support wildlife (including beneficial insects and some migratory birds), and provide beautiful scenery.



A 3,800-square-foot green roof at Temple University, Ambler, Pa.
Photo courtesy of Roofscapes, Inc.

With less wear and tear, cool roofs will last longer.

"Since solar radiation is a major cause of roof deterioration, cool roof coatings can significantly increase the life of the roof membrane," says the CHPS *Best Practices Manual*.

Schools can make their roofs cool by applying coatings or by installing cool single-ply membranes. The EPA says cool roof coatings typically are white liquids—elastomeric, polyurethane or acrylic—with the consistency of thick paint. Applied over an existing roof structure, they can last 10 to 20 years, depending on quality and thickness.

The CHPS *Best Practices Manual* recommends that schools that have asphalt roofs with a cap sheet or a modified bitumen roof should apply coatings with an initial reflectance of 0.7 and emittance greater than 0.8 (both measures represent a scale from 0.0 to 1.0—the higher the number, the "cooler" the roof).

The types of cool single-ply membrane roofs include ethylene-propylene-diene-terpolymer membrane (EPDM), an elastomeric material; polyvinyl chloride (PVC), a synthetic thermoplastic polymer; and thermoplastic polyolefin (TPO), a blend of polymers that also may contain desirable additives such as flame-retardants or UV absorbers. It can last 30 years and is largely maintenance-free. PVC is the most expensive of the three, but has a track record of long-term performance, the EPA says. ■

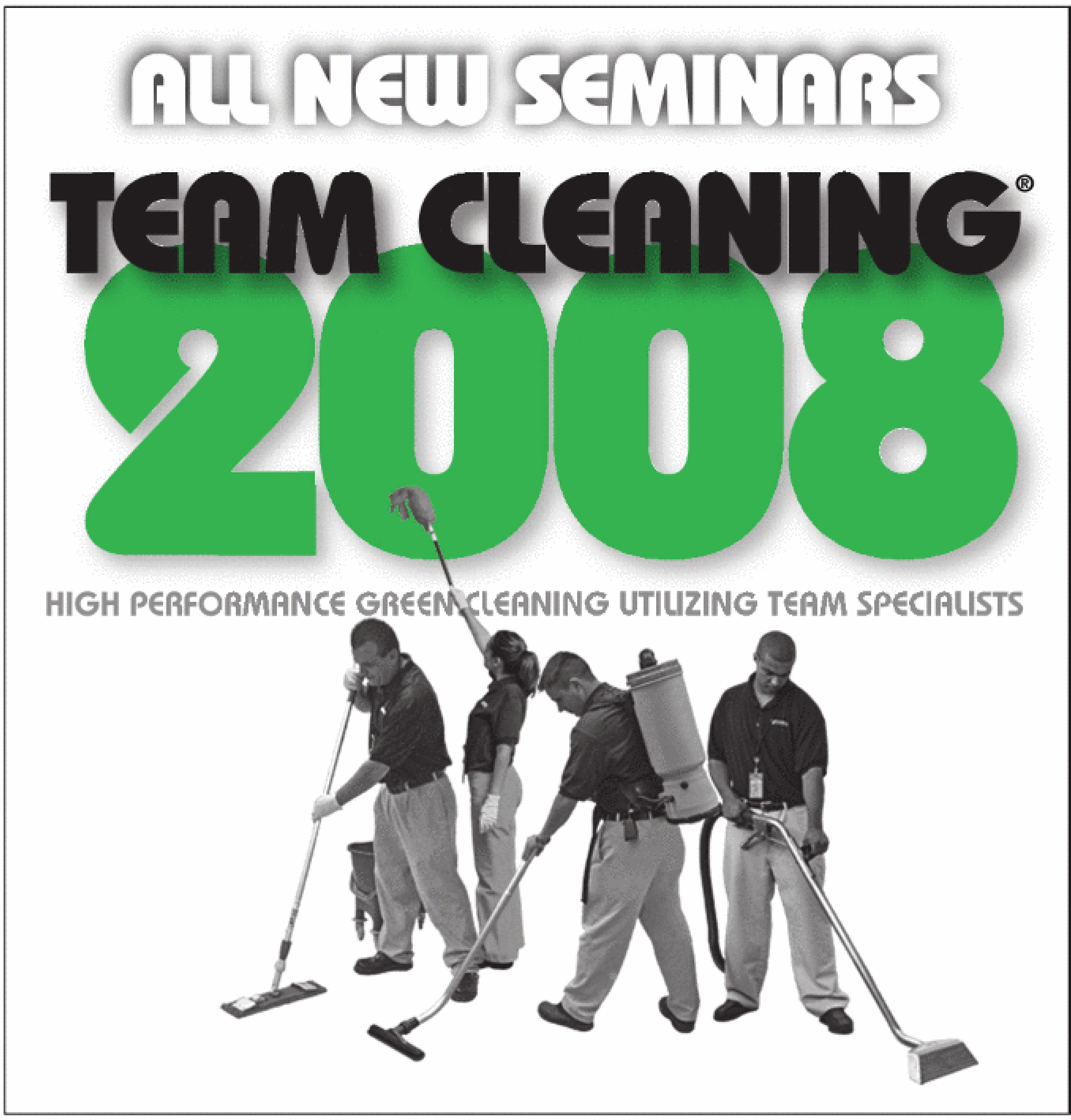
NOTABLE

90 Percentage of roofs in the United States that are dark-colored.

150 to 190 In degrees Fahrenheit, the temperature reached by dark-colored, low-reflectant roof surfaces.

Source: U.S. Environmental Protection Agency

Kennedy, staff writer, can be reached at mkennedy@asumag.com.



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SCHOOL SECURITY

Strategies to improve the safety of students, staff and facilities

INSIDE THIS SPECIAL SECTION:

- **Security Technology** p. 42
  Mitigating threats with cameras
- **Emergency Planning** p. 48
  Protecting vital records
- **Security Product Solutions** p. 53

Kelly Lane Middle School
Pflugerville, Texas

Architect: SHW Group LLP
Photographer: Mark Trew

AN EYE ON SAFETY

Education institutions can mitigate threats with new security surveillance technology.

By Jon Ecker

With strategic placement of cameras, schools and universities can observe individuals continuously as they make their way around campus.

One of the principal responsibilities of any school or university is to provide a safe and secure environment where students can further their intellectual growth. Likewise, the faculty and other staff whose work is essential to day-to-day operations should be able to focus entirely on their duties rather than their safety. The violent incidents at our nation's schools and universities over the last decade have driven home an ugly reality. Schools now must secure their facilities and campuses against not only external dangers, but also those found from within. These dangers require security strategies that are innovative, sensible and affordable.

Today, digital video recording (DVR) technology has revolutionized the security and surveillance field, and expanded the options available to education institutions. VCRs with videocassettes once were the standard, but they required a lot of maintenance and delivered unstable results. The grainy, black-and-white pictures produced by obtrusive cameras and multiplexed VHS recording are being replaced with high-resolution digital surveillance systems.

Fed by discreet cameras, the crystal-clear footage recorded on a digital system enables school security personnel to observe even the most inconspicuous details—such as a small object changing hands between two students. With strategic placement of cameras, schools and universities can observe individuals continuously as they make their way around campus.

Commensurate with advances in recording is the progress in camera technology. Digital security cameras

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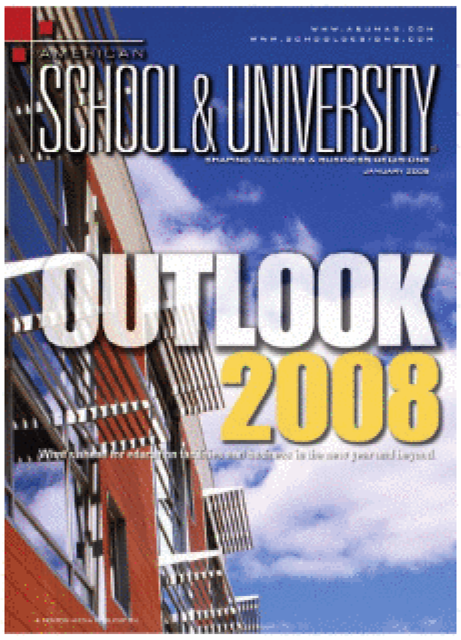

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typically include such high-tech capabilities as infrared recording with day and night settings, pan tilt and zoom (PTZ) positioning, and vandal-resistant domes. In addition, digital recording now is performed on computer disc drives capable of storing data for many years.

Software-based solution

Many digital security systems are available. One cost-effective network video recorder (NVR) solution is Internet protocol (IP). An NVR runs on a standard PC or network server and records video from one or more network cameras or analog cameras. These systems can be integrated into any existing IP data network. Given the prevalence of the Internet, most schools already will have such networks in place.

NVR software applications connect to digital network closed-circuit television (CCTV) cameras that work with local area network (LAN) cables, which already should be installed in places with high-speed Internet access.

Security personnel can view live feeds from these cameras or review stored footage from any computer with access to the server. NVR software even can work with existing analog cameras when used with a video encoder.

> Placing cameras in strategic areas may be as important as the type of equipment.

Why Windows?

Windows-based operating systems have many advantages over embedded operating systems. They are ubiquitous in business and can integrate with other Windows software. These systems offer sophisticated feature functionality and provide a variety of remote access benefits.

The data itself can be stored on the hard drive of an existing network server. In some cases, it is necessary to expand the hard drive's storage capacity. Some schools and universities may decide to acquire "advanced searching" software, which enables security personnel to quickly review saved images. This can be critical when going through hundreds of hours of recordings.

CONTINUED...

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A security camera system works only as well as the location it covers.

Other features can benefit campus security: simultaneous recording, playback and live viewing options; data storage both locally and at a remote location; centralized management of multiple systems; motion detection and other event-activated recordings; event alerting via e-mail or SMS/text messaging; and simple integration with network, digital and analog cameras that already may be in place.

The right shots

Purchasing the right cameras is integral to a system's effectiveness. Failing to upgrade cameras—especially if a system is analog rather than digital—often is pennywise but pound-foolish. Outdated cameras may compromise the quality of the footage. If grainy analog footage is all that is available to the authorities investigating an incident, their efforts to determine what happened may be thwarted.

Ideal network cameras require a frames per second (FPS) capacity of no less than 30 FPS per camera for recorded data. Speed criteria also apply to live viewing. With a 16-camera system as the benchmark, the most efficient live viewing occurs with 480 frames per second.

CCTV is optimal for security personnel. It provides the capacity to monitor and track activity throughout an institution with flexibility and ease of use—and in real time. Modern systems can handle limitless numbers of cameras, delivering live and archived video feeds up to 30 frames per second, per camera.

A CCTV station also provides 24/7 video-analytics technology to detect stationary and mobile objects across multiple school buildings. It is an intelligent system that tracks and responds to events in real time and helps mitigate security risks.

Placing cameras in strategic areas may be as important as the type of equipment that is used. A system works only as well as the locations it covers. The first lines of defense for security surveillance include entrances and exits. In addition, external security cameras should include dropoff and pickup areas, rooftops and parking lots.

Beyond the egresses and their surrounding areas, cameras should be placed wherever students gather, such as hallways, stairways, gymnasiums, cafeterias and libraries. Rooms in which theft may occur, such as computer/IT rooms and sports equipment rooms, also should be monitored.

Exploring the benefits

Security surveillance provides numerous benefits. Cameras help deter fights and attacks, and when violent acts do occur, they are more likely to be stopped quickly. Students who know they are being monitored may decide to avoid illegal behavior, such as smoking, drinking alcohol or drug use.

Video recordings provide schools with documentary evidence that can mitigate the risk of fraudulent liability lawsuits. School faculty and administrators can focus on education, rather than security.

Some argue that surveillance cameras infringe on the privacy of students and staff. Schools are encouraged to place cameras primarily in common areas to minimize the sense of intrusion. ■

Ecker is president and CEO of Peace of Mind Technologies, LLC, a New York City-based security technology company specializing in educational facilities, as well as other vertical markets.

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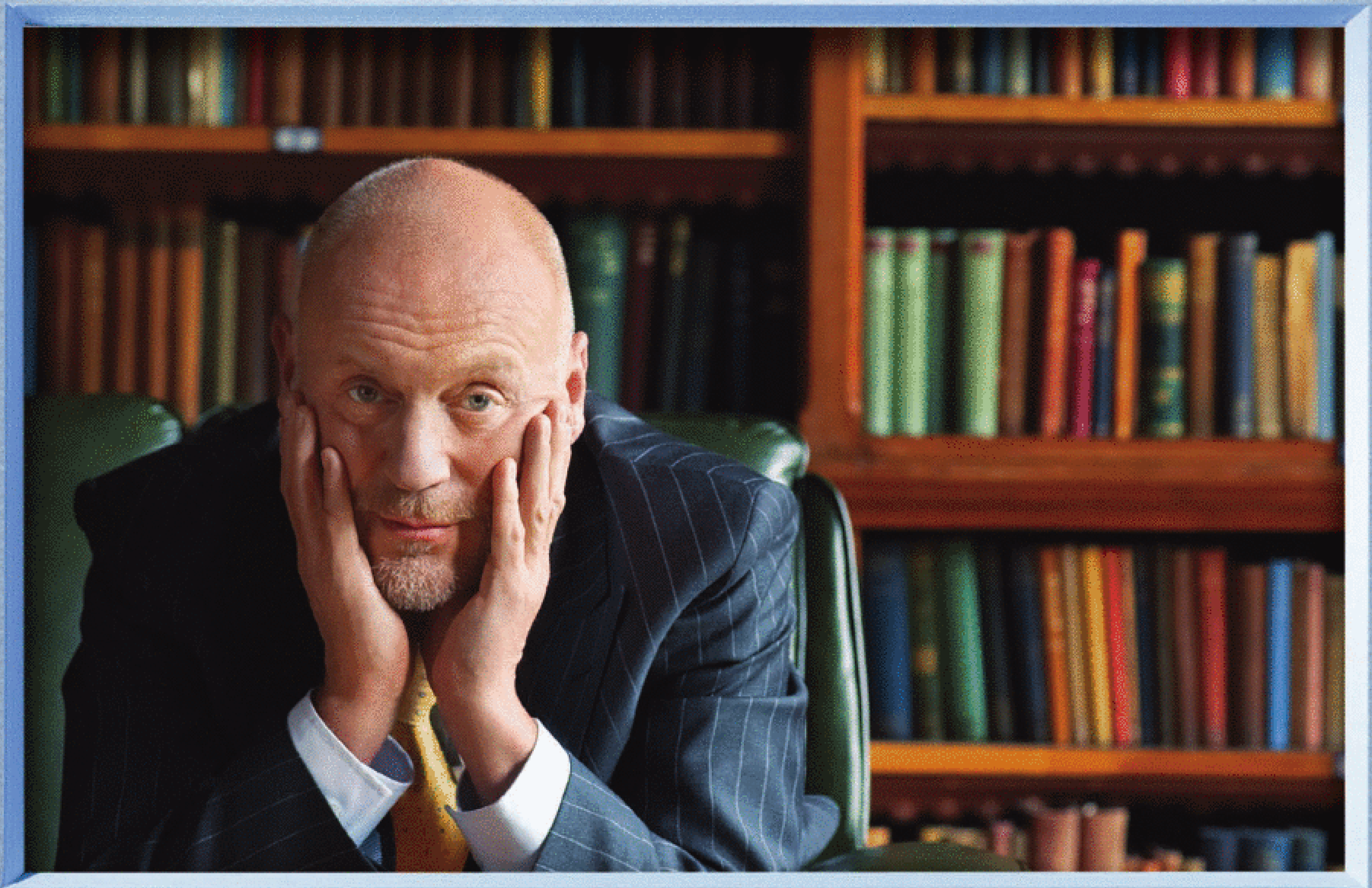

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FOR THE RECORD

Education institutions should consider the importance of protecting vital records when planning for emergencies.

By Van Carlisle

Keeping student records intact during a disaster is an essential component of emergency-management planning.

The chaotic confusion that follows a fire, flood or other disaster is harrowing for an education institution. Once the danger to human life is controlled, however, the focus must center on recovery. Emergency-management plans serve as the main guide to prepare for, respond to and recover from a disaster that may affect any number of crucial functions. Having an emergency-management plan in place ensures that a school or university will be able to sustain losses stemming from a crisis and recover in an expedient manner.

One of the first steps in emergency-management planning is vital records protection (VRP). Records are critical to education, and installing a process for storing and retrieving data is considered to be a basic operational requirement for all education organizations. If a vital record is lost, damaged or otherwise rendered unavailable, that loss becomes a disaster-within-a-disaster.

Most emergency planning is designed primarily to ensure life safety. VRP is about mitigating loss and limiting property damage. These are two different concepts that need to be viewed from different perspectives.

Defining a vital record

In an education institution, student records are considered vital. But they are not the only categories of stored information that may be deemed as vital in the education environment. Some typical examples:

- Critical data relating to written curriculums.
- Contracts and agreements that prove ownership of property, equipment, vehicles and products.
- Operational records, such as budgets, accounting and tax records, personnel and payroll records.
- Standard operating procedures (SOPs).
- Reports, audits, test scores and summaries.
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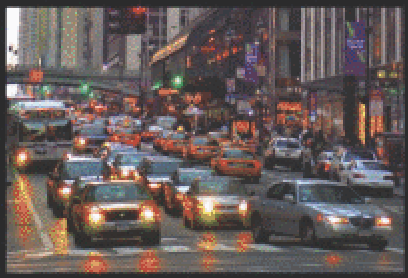

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When keeping vital records on-site, it is recommended that education institutions store them in a fire-resistant file cabinet or vault that has been tested and rated by Underwriters Laboratories.

Records survive disaster

In 2005, floods ravaged the Gulf Coast in the wake of Hurricanes Katrina and Rita. The Pass Christian School District in Pass Christian, Miss., was hit with a 30-foot storm surge that swamped the entire region—as far as 15 miles inland in some places.

Pass Christian High School was submerged under 18 feet of water, and the district's middle school and one of its elementary schools were destroyed. The school district reopened several weeks after the storm on October 17, 2005. Once the recovery process began, staff members especially were concerned about the district payroll.

"The district central office was at one point under 30 feet of water, and when I returned to Pass Christian immediately after Hurricane Katrina, the only thing still standing inside was the district's UL-rated fireproof file cabinets," says Patty Myriek, a specialist in the district's human resources department.

"All the schools' payroll records were kept safely inside the specially designed cabinets, so we were able to get our payroll system back online right away and get our people paid. As you can imagine, getting funds to our employees—who were in many cases drastically affected by the flood—was a very important factor in the overall recovery process."

Some of the worst damage to vital records from a fire actually can occur from the water used to extinguish the flames.

This list should be considered a starting point. Although a specific category of records may not be considered vital, the data still may be worth protecting. Each category of record should be analyzed to determine the amount of protection it should receive. Non-vital (but valuable) records may be tiered as such:

•**Important records**: records that are replaceable, but reproducing them could be expensive, time-consuming and labor-intensive.

•**Useful records**: records that, if lost, will cause some inconvenience, but could be replaced readily.

•**Non-essential records**: records that are in line for routine destruction.

In order to validate the classifications, those responsible for emergency planning should interview the managers and personnel who create and manage the organization's records.

Assessing strategies

If VRP is the first step in the emergency-planning process, then the first step in developing a VRP strategy is to assess the threats to vital records. Identify specific risks, such as

fire; flooding of storage areas; earthquakes that could cause a building collapse; and periodic storms or tornados that could endanger digitally stored vital records. With electronic data, poor care or storage can cause problems—simple things such as spilled coffee or inappropriate handling.

VRP describes both the process and the tools deployed to prevent the loss or destruction of vital records that are essential to an organization's continued operation. The basic action that VRP drives is storing vital records and documents in UL-rated fireproof files and safes. The National Fire Protection Association, Standard 232, "Protection of Records" recommends storing vital records in a fire-resistant file cabinet or vault that has been tested and rated by Underwriters Laboratories when keeping them on-site.

Some of the worst damage to vital records from a fire actually can occur from the water used to extinguish the flames. Sprinkler systems and fire hoses can cause irreparable harm to documents that are not protected properly. It is, however, impossible for a VRP product to be fireproof, as well as waterproof. When a fireproof cabinet is exposed to extreme temperatures in a fire, it expands by design, making it more difficult for water entry; however, when sprayed with a fire hose or submerged, no fireproof filing cabinet will be able to keep contents completely dry.

In order for a filing cabinet to be completely waterproof, it must be designed to withstand complete submersion in water; leaving little to no damage to internal documents. A cabinet that is water-resistant will be able to endure the effects of fire-suppression systems, such as sprinkler systems, as well as high-pressure fire hoses, sustaining minimal water entry during the process.

Some organizations, especially larger districts and university systems, may choose to outsource vital records protection, mainly to off-site storage facilities. This may work for archived records; however, for current information (such as student records) storing all vital records off-site requires such a high degree of discipline and coordination that it will become too expensive and time-consuming for most organizations. So, education institutions must ensure vital records are secure while they remain onsite.

Other drivers of VRP

In addition to smart disaster-recovery planning, several regulations, laws and best practice policies drive VRP. For instance, the Oklahoma State Department of Education requires student records to be in fireproof file cabinets. In New Jersey, when a public district is involved in litigation, the records must be retained and accessible for 20 years after the

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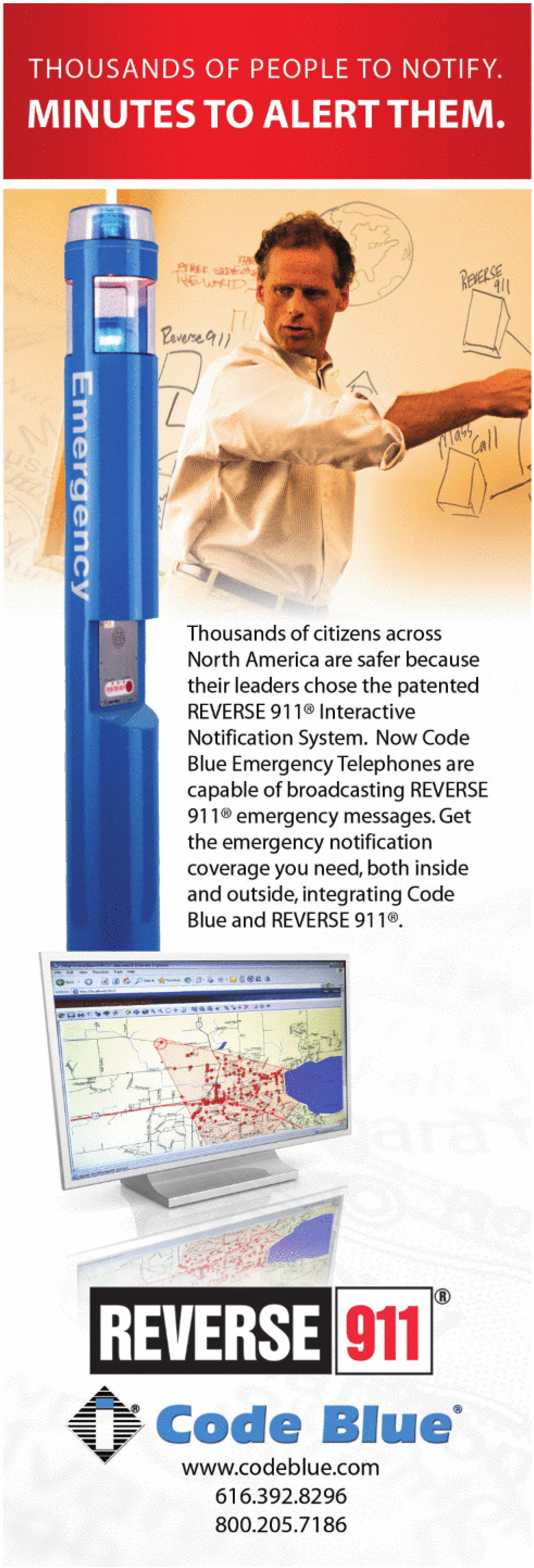

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In addition to smart disaster-recovery planning, several regulations, laws and best practices drive VRP.

final settlement. The New York State Office of Elementary, Middle, Secondary and Continuing Education provides a School Safety Audit Checklist that clearly states: "School files and records are maintained in locked, vandal-proof, fireproof containers or vaults."

The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C.-1232g; 34 CFR Part 99) is a federal law enacted in 1974 that protects the privacy of student education records. Under FERPA, schools are required to keep personally identifiable information secure and limit access to it. The law applies to all schools that receive funds from the U.S. Department of Education. If a school is found to be in violation of the act, it risks losing federal financial assistance.

The Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule establishes regulations for the use and disclosure of Protected Health Information (PHI). A school or school system is covered under HIPAA if it has a healthcare provider (school nurse) who transmits health information electronically in connection with a HIPAA transaction.

More recently, the No Child Left Behind Act requires schools to maintain and report large volumes of student data.

As the number of school-age children continues to rise, the need for K-12 and university systems to better manage vital records will increase. ■

Carlisle is president/CEO of FireKing Security Group, a security and loss-prevention company headquartered in New Albany, Ind.

WEB 101

For more articles on security, life safety, disaster planning, access control and more, visit our Security Resource Center at www.asumag.com/security.

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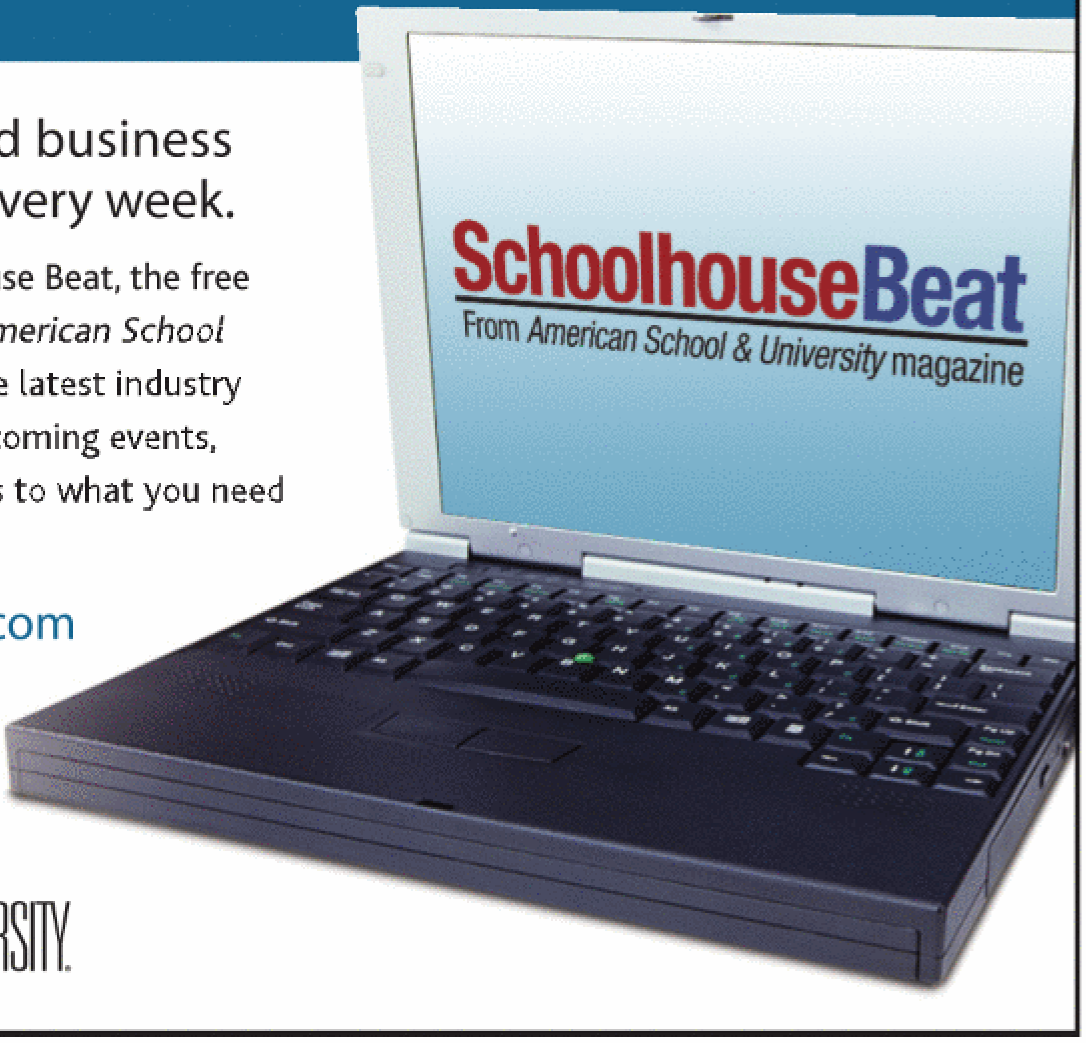

SchoolhouseBeat
From *American School & University* magazine
AMERICAN SCHOOL & UNIVERSITY

Work in Progress

President Bush signs bill on healthful schools.

STEPHEN ASHKIN

Ashkin is executive director of the Green Cleaning Network, a 501(c)3 not-for-profit educational organization.
www.GreenCleaningNetwork.org
SteveAshkin@GreenCleaningNetwork.org

The year 2007 ended with some wonderful news for schools and universities. Contained under Subtitle E of the Energy Independence and Security Act of 2007 were requirements for healthful, high-performance schools.

Among other things, the bill authorizes the U.S. Environmental Protection Agency (EPA) to develop model guidelines for environmental health in schools. The agency will receive $10 million over five years to develop the guidelines, and $1 million over five years to look at the health and performance impacts associated with healthful schools.

The bill calls for technical assistance from the EPA's *Tools for Schools* and the Healthy School Environmental Assessment Tool (HealthySEAT) programs to address environmental issues. It also calls on states to develop and enact school environmental-health programs that include standards for school building design, construction and renovation.

One component of the standards focuses on school site selection and requires states to develop voluntary guidelines within 18 months. These guidelines must account for the greater vulnerability of children to hazardous substances or pollution; modes of transportation available to students and staff; the efficient use of energy; and the potential use of a school site as an emergency shelter.

One challenging aspect of the bill is identifying ongoing school building environmental problems. The bill requires schools to identify contaminants, hazardous substances and pollutant emissions. And it says that states must develop recommended solutions to address those problems, including assessment of information on the exposure of children to environmental hazards in school facilities.

The bill requires that environmental problems, contaminants, hazardous substances and pollutant emissions be taken into account. The law specifically mentions daylighting; ventilation choices and technologies; heating and cooling choices and technologies; moisture control and mold; maintenance, cleaning and pest-control activities; and acoustics.

All of these issues are important, and the resulting information should provide better strategies for building and operating healthful schools and universities. However, the amount of funding to develop the guidelines is inadequate; school advocates should urge Congress to boost funding so that states and schools can meet requirements.

With additional information, schools and universities will be able to help communities understand the need for appropriately funding schools. Most likely when all is said and done, very little "new" information will be discovered. But the value of having well-researched and objective information may be just the solution to help get the funding. ■

Fresh Perspective

Don't forget the students when gathering design ideas.

JAMES E. RYDEEN

Rydeen, FAIA, is an architect/facility planning specialist and former president of Armstrong, Torseth, Skold & Rydeen, Inc. (ATS&R), Minneapolis. He can be reached at Jrydeen@atsr.com.

"Learn while we eat! Make your mark! Personalize your locker! Create a memorable experience! Make stairs a learning experience!"

These were the directives of Teen Design Camp 2007, hosted by the University of Minnesota College of Design.

This year's theme was school design. Each of six workshops focused on redesigning some aspect of a school. Each teen selected a design specialty. The schooling workshop focused on "rethinking your learning environment." The designers responded to planning and design questions such as:

•What do you love about your school?

•What would you improve if you could?

•Where and how do you learn?

The teen designers experienced a different style of learning. They were challenged to create, develop, refine and "sell" their own ideas. In response to "how and where do you learn," the schooling group decided to look at the design of the space that hosts the final reception for students, parents and guests.

The students were designing the space for displaying, presenting, disseminating and eating refreshments. They developed multiple programs and tested them through scenario planning and programming exercises (just as in designing a school). Ultimately, the group had to design for multiple uses and user groups.

The students incorporated video projection, signage, graphics, lighting and innovative uses of common materials. By using a scaffolding structure and recycling highway billboards, students minimized their designs' ecological footprints.

Students from each workshop presented their final design ideas to members of juries. Some of their ideas:

•Trash receptacles decorated to graphically reflect waste.

•Recyclable trash baskets covered with plastic water bottles on all sides and caps decorating the lid.

•Recyclable paper baskets covered with newspapers.

•Making stairs a learning experience with decorative graphics such as "Exercise!"

•Personalizing student lockers graphically, expressing the individuality of each student and creating easy identification for the student.

•"Make Your Mark" bulletin board allowing students to graphically express themselves.

Next time you begin planning and designing a school facility, expand the task force beyond architects, educational planners, the school board, administrators, teachers, parents and business leaders. Invite students to get involved. Their innovative ideas may expand your horizons. ■

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Safe and sound

Web-based access control improves student safety at private school

The Appletree School, Fairfax, Va.
Photo courtesy of The Appletree School

Brivo. The Appletree School, Fairfax, Va., is a private school that serves the community's preschool through fourth-grade students. Its proximity to the Washington, D.C., Metro system provides convenient access for parents and teachers, but also poses some access-control concerns for the school building.

"Since we are very close to the Vienna Metro stop, we used to have people wandering in off the street," says Beckii Pittman, administrator. "We even had people recently released from jail coming in looking for the Metro station."

The school keeps its doors locked from the outside, except for the front entrance, which normally is staffed by the school nurse. However, the nurse has other duties as well and can't always monitor the entrance. The school also needed to provide easy-to-administer access after hours and during holidays for teachers and staff. It had a limited budget and possessed minimal technical resources to administer an IP-based access-control solution.

The school selected the Brivo Access Control System (ACS) to be installed on the front door, and assigned PIN codes to parents and teachers. Brivo manages all IT maintenance of the system, eliminating the need for expensive IT resources or technical expertise.

School administrators have benefited from the Web-based administration capabilities by being able to log onto their account from home to monitor activity and manage access. Such access and ease of use have been especially helpful on days when the school is closed because of inclement weather. Also, user credentials can be set to specific schedules, allowing access-control flexibility.

As a result of installing the new system, parents and teachers have a much greater peace of mind knowing that the service has increased school safety.

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Food-service wipers

SCA Tissue. Tork Premium Cuisine Cloths are low linting, more absorbent than linen, and durable enough to be washed for reuse. Tork Premium Cloth with Microban has a protective antimicrobial formula that inhibits the growth of bacteria, mold and mildew. Tork Premium Cloth with Quat-Safe prolongs the life of sanitizing solutions, allowing for cleaner surfaces and reduced contamination.

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Pull-down stairway

Precision Ladders, LLC. The Super Simplex Disappearing Stairway is a commercial-grade, fire-rated, pull-down stairway that meets ANSI A14.9-2004 standards and has an individual tread test weight of 1,000 pounds. Options include a lock on the door panel, a special deep frame to accommodate dropped ceilings, a recessed door panel for installation of ceiling finishes, a factory-mounted roof hatch, and a two-hour fire rating that meets ASTM E-119 and UBC 43-7 requirements.

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Portable air conditioner

Atlas Sales & Rental. The Kodiak Series 7.5-ton spot cooler, manufactured by NorthWind, Inc., is available for rental or purchase and may be used for primary, supplemental or emergency cooling. It is compact enough to fit through a 32-inch door and cools larger areas with fewer units, allowing easier transport and operation while using fewer electrical lines. It also is the first unit of its type to be UL-listed and CSA-certified for outdoor use.

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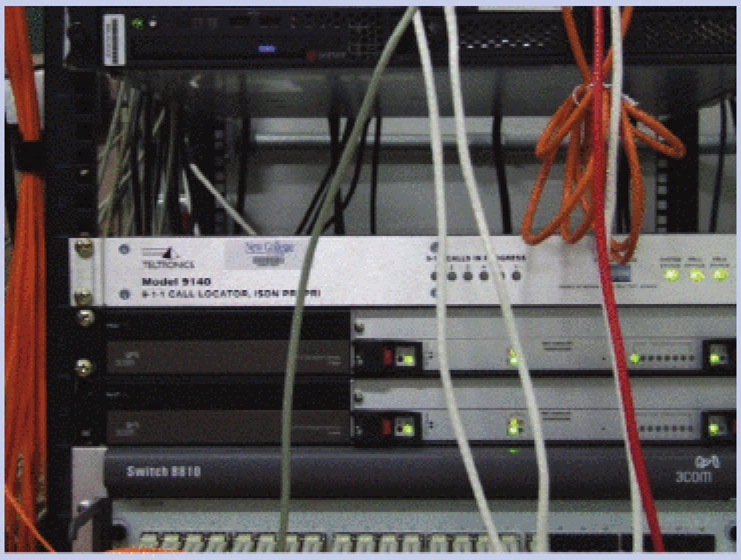
Emergency enhancements

Campus E911 solution provides fast, accurate communication in urgent situations



New College of Florida, Sarasota. Photo courtesy of Ryan Robinson/New College of Florida

Teltronics, Inc. After selecting a new telephony system in 2006, New College of Florida, Sarasota, required an Enhanced 911 (E911) solution to keep the student and staff population of about 1,500 safe in case of an emergency.

Previously, when someone on campus dialed 911, the call would bypass the campus police department and go directly to the Public Safety Answering Point (PSAP), providing minimal and often erroneous information about the 911 call location and caller. The college needed a fail-proof, secure system.

It chose Teltronics Telident Call Locater, SiteAlert, SiteAlert ALI Manager, and ALI Service Bureau as an E911 solution. Call Locater is a controller that is installed between the college's pure VoIP system and the public telephone network to translate a 911 caller's station number to a format compatible with the E911 system. SiteAlert provides on-site notification when 911 is dialed in a business or campus environment that is equipped with a VoIP solution or a PBX. On-site notification allows college personnel to provide first responders with detailed information about the emergency and call location. SiteAlert software generates an alarm on PCs at these locations, providing essential Automatic Location Information (ALI). The SiteAlert database may include specific information about the caller or location, such as a critical medical condition or the presence of hazardous materials, alerting on-site personnel and first responders before they arrive to the scene.

The system is an easy-to-use, responsive E911 solution that allows administrators to make moves, adds and changes while keeping students, staff and faculty safe.

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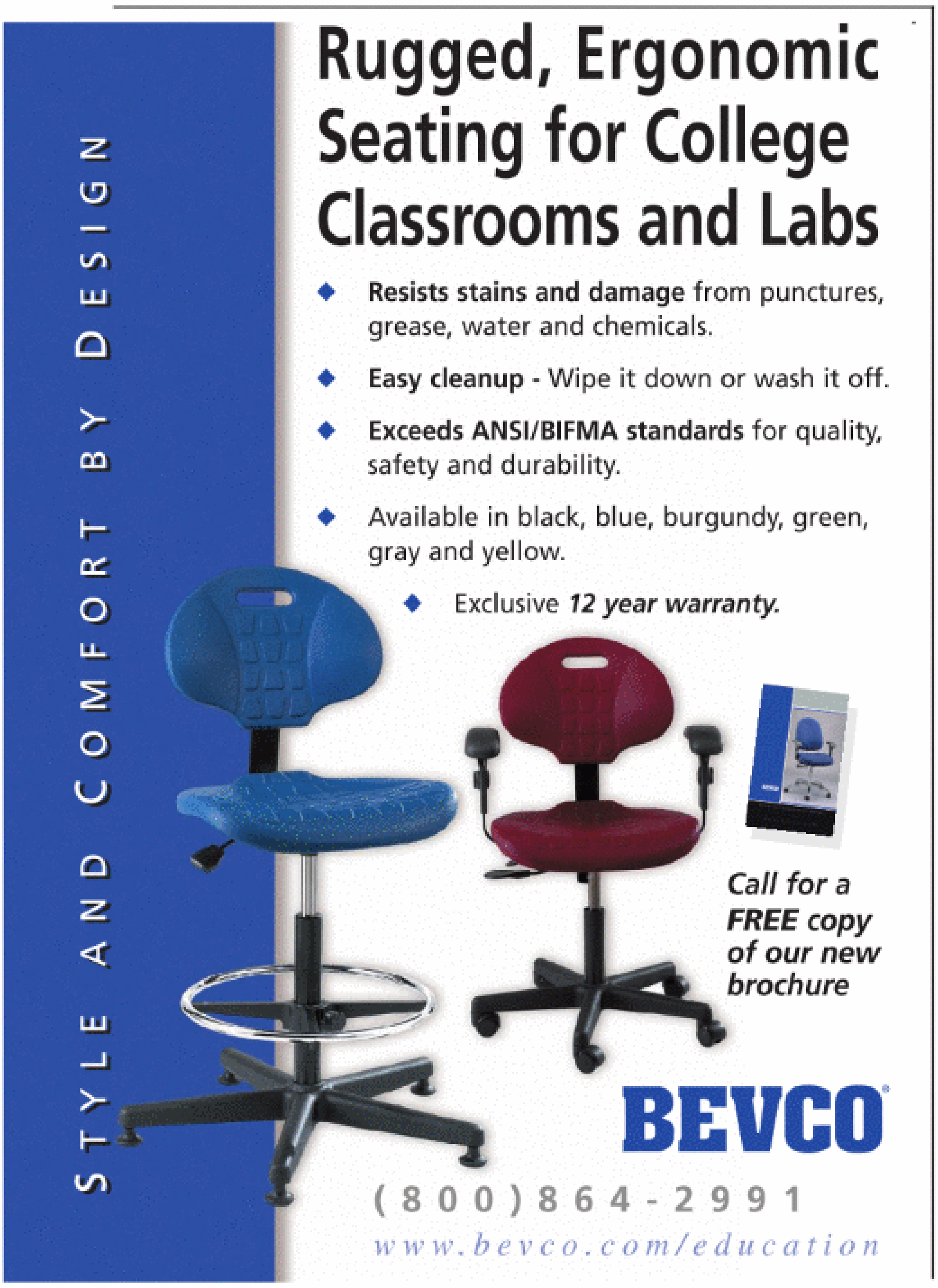

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Mold control

Siamons Int'l. Concrobium Mold Control is an anti-microbial solution that eliminates and prevents mold without bleach, VOCs or harmful chemicals. The odorless, colorless, patented product dries on moldy surfaces to encapsulate and crush mold spores. Requiring no isolation time or special handling, it stays on to provide continuous protection against mold and mildew regrowth.

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Fire protection

Viking. The VK503 sprinkler is an ESFR pendent sprinkler with a K factor of 16.8 (242). It uses a fast-response fusible element and provides protection for most common storage materials without the use of in-rack sprinklers. The sprinkler is cULus-listed and FM approved for buildings up to 40 feet high and storage heights up to 35 feet with no in-rack sprinklers. It also is approved for buildings up to 45 feet high and storage heights up to 40 feet with one-row, in-rack sprinklers installed.

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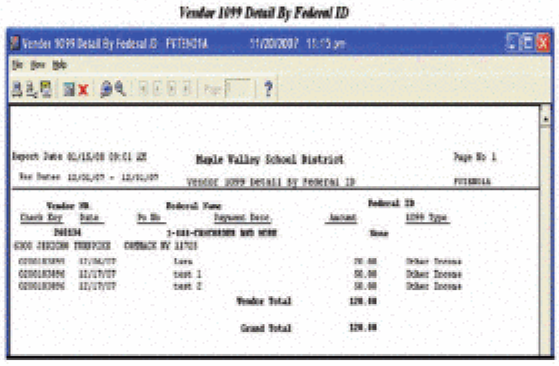

Administrative software

Weidenhammer. A software upgrade is available for alio, a comprehensive suite of software for human resources and financial management in education. Designed with accounting procedures, auditing controls and comprehensive reporting capabilities, alio automates the financial, payroll and personnel needs of school districts. New features of alio 8.2 include updated W-2 processing, facilitating tax reporting and payroll finances; 1099 processing enhancements; grant reporting; and the ability to create budgets from requisitions.

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Classroom seating

American Seating. The Enhanced Fixed Lecture product line is a contemporary educational solution engineered to fit any seating plan and layout. The Contemporary and Traditional fixed lecture solutions offer two different looks: one modern and one classic. Both can be paired with three different seating selections: eko, a square mesh back or fully upholstered option; Cachet by Steelcase for a progressive green solution; and Acton for an ergonomic and cost-effective choice.

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Access control

Ingersoll Rand Security Technologies. BrightBlue by Schlage is a Web-based access-control system that enables users to access, monitor and manage their system from any computer running a standard Web browser. It is designed for applications with one to 32 doors. The system's plug-and-play design makes configuration easy, and the embedded application eliminates the need for special software or a dedicated PC. When used with Schlage wireless and VIP wired locks, it does not require a reader interface and other hardware.

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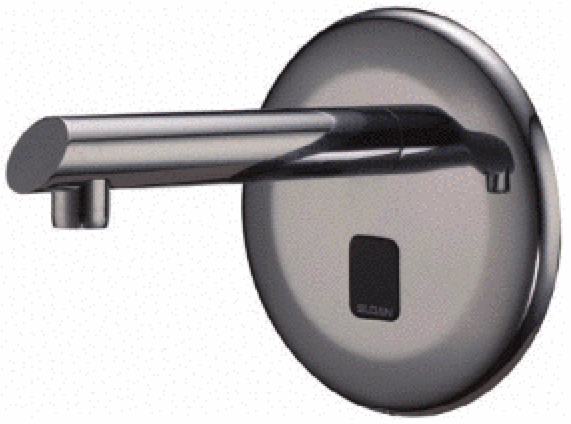

Electronic faucet

Sloan. The Optima ETF-800 wall-mount electronic faucet is an aesthetic addition to any restroom, while offering long-lasting reliability. The sensor-operated faucet automatically delivers either tempered or hot/cold water. Two water-efficient aerators are included: a 1.5 gpm/5.7 Lpm laminar flow spray head and a 0.5 gpm/1.9 Lpm spray head. User-friendly variable timeout settings further ensure water savings. A modular quick-release sensor and solenoid connections, as well as a sensor range adjustment screw, simplify installation.

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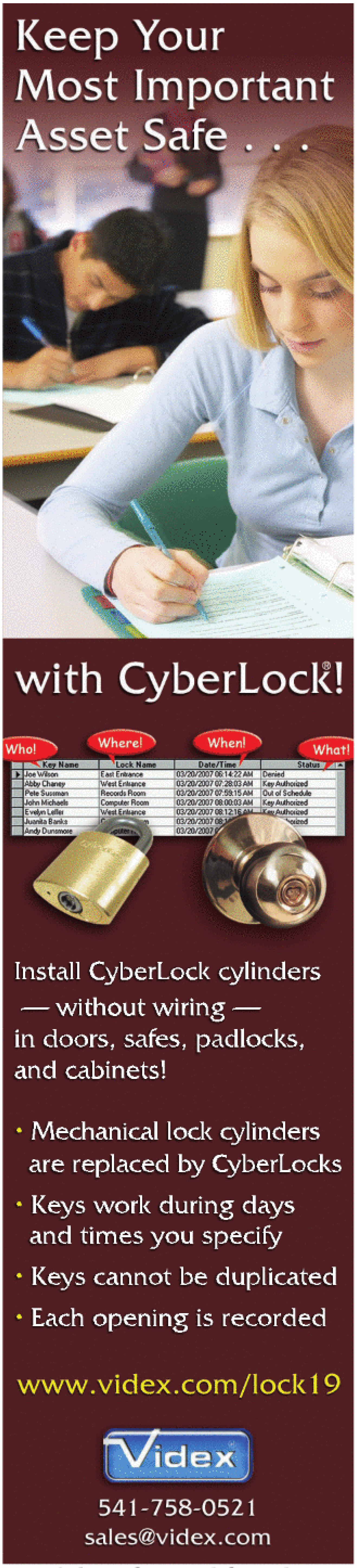

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On display

Middle school library features high-performing plasma monitors

Midlakes Middle School library, Clifton Springs, N.Y.

Hitachi. Midlakes Middle School, Clifton Springs, N.Y., recently installed two Hitachi 55HDM71 professional plasma displays in its library, which features a collection of more than 7,000 books and electronic resources. The online library catalog can be searched from any computer on the school network.

The plasma displays are used to educate students on using the library's resources effectively. The school library media specialist, Mike Purcell, regularly uses the displays to give presentations to students.

"We have a very nice facility here, and we wanted to have displays that would not only serve our current needs, but would be reliable enough that we could utilize them for possible future applications like streaming video," he says.

Because of the large amount of ambient light in the library, brightness was another important issue.

"One of the problems we have is a large window in the library that brings in a lot of light," says Purcell. "We needed something that wouldn't be easily washed out. The 55HDM71 fulfilled our requirements in that respect, and we have had no problems seeing the image."

Since being installed, the displays' high performance and ease of use already have proven beneficial.

"We installed them where they're visible from outside the library, and they've been catching everyone's attention," says Purcell. "In addition to being effective presentation displays, we've also found them to be effective tools to generate interest in the library among the students."

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Multifunctional cart

Smith System. The Anything Truck has six spacious cubbies on top and two flat shelves below, and is GREENGUARD-certified. It helps teachers manage classroom essentials that can become disordered and cumbersome, allowing for easy storage and distribution of class and library materials. Available in 11 different colors, the cart also can be used with a color-coding system. ■

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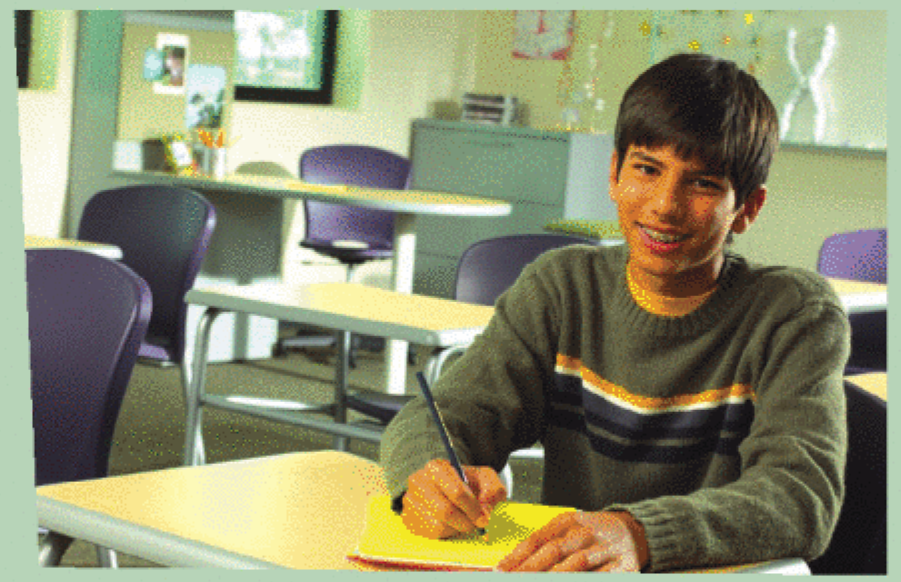
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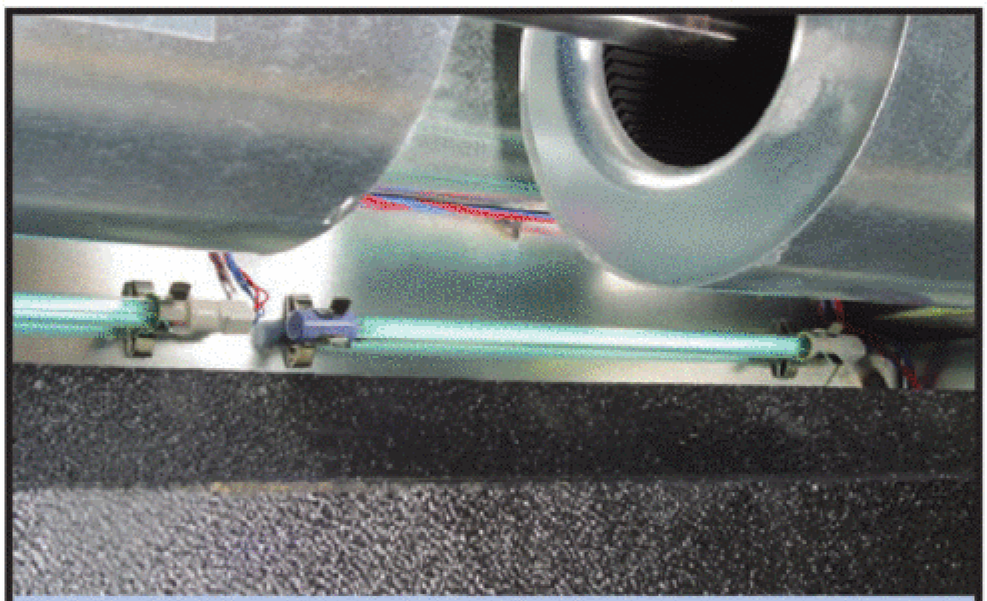
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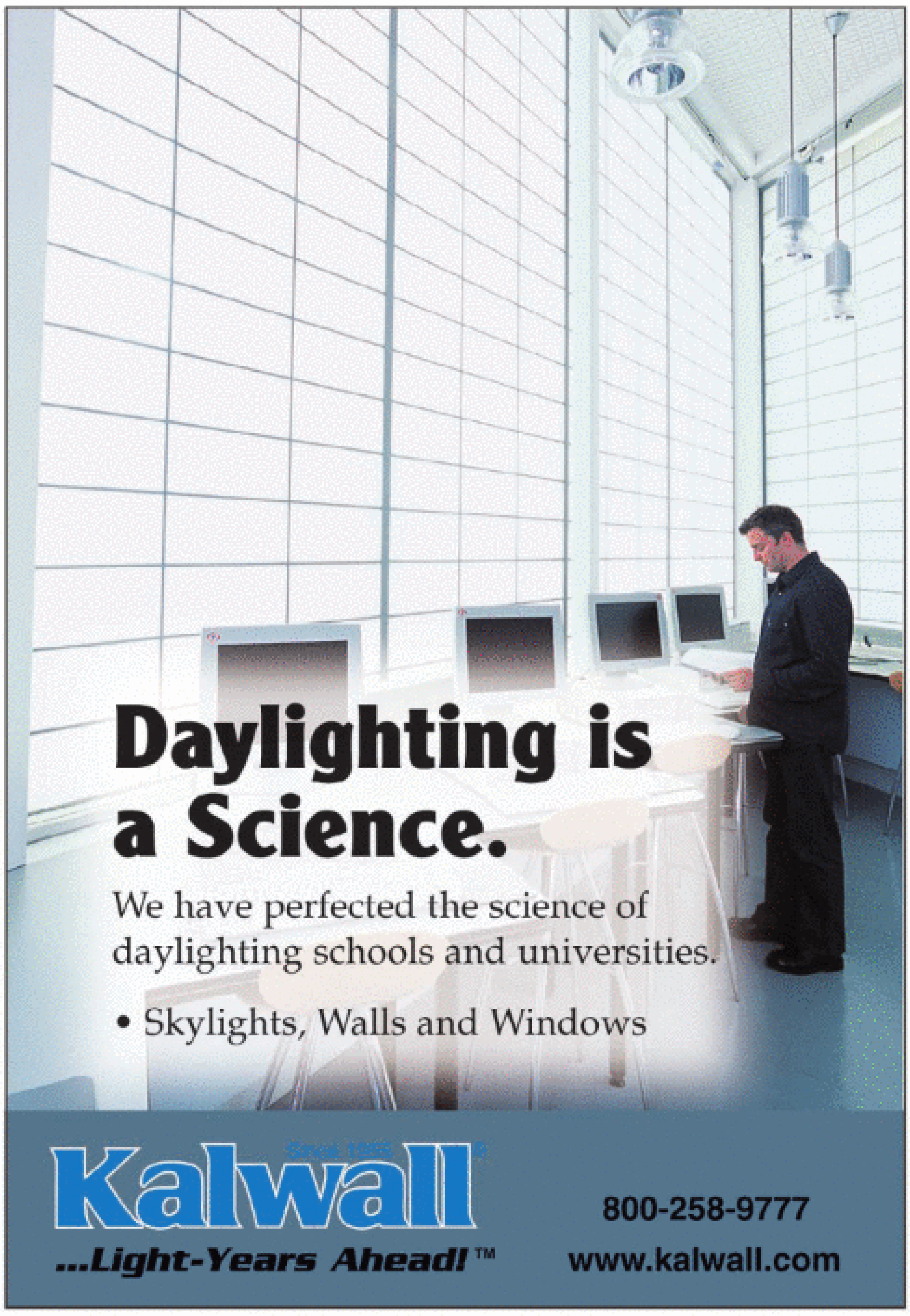

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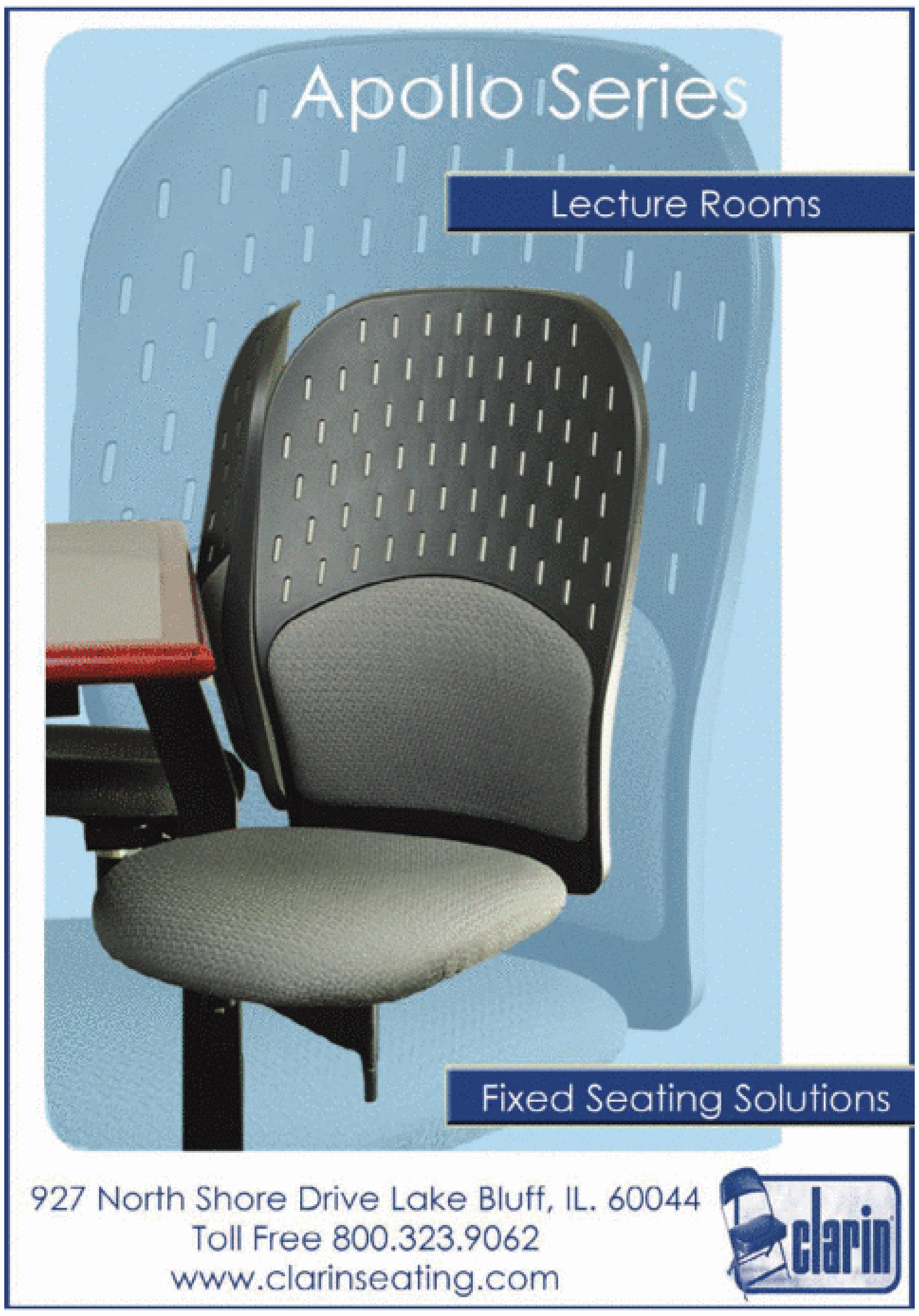

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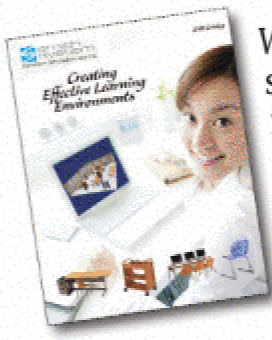

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